ARIZONA STATE UNIVERSITY
A15044525318

DISCARDED

DISCARDED

DISCARDED

INSTINCT

A STUDY IN SOCIAL PSYCHOLOGY

BY

L. L. BERNARD

PROFESSOR OF SOCIOLOGY, UNIVERSITY OF MINNESOTA

HM
255
B4
West

NEW YORK
HENRY HOLT AND COMPANY

72446

COPYRIGHT, 1924,
BY
HENRY HOLT AND COMPANY

PRINTED IN THE
UNITED STATES OF AMERICA

158
7

TO MY HONORED FIRST TEACHERS

PROFESSOR CHARLES A. ELLWOOD,

who taught me that society is greater than the individual and to whom I owe more than words will repay,

and

PROFESSOR MAX F. MEYER,

who made psychology the delightful doorway to scientific method and whose friendship has been one of the pleasantest memories,

I offer this inadequate tribute, confident of charity in disagreement, where their knowledge is greater than mine.

Digitized by the Internet Archive
in 2025

https://archive.org/details/bwb_S0-DTL-830

PREFACE

The present work is the result of interrupted labors which began in a graduate seminar in the year 1909–1910, when the author attempted to apply Professor McDougall's classification of instincts to the classification of criminals. The immediate result was the conviction that McDougall's instincts were habits, and further constructive work found issue in an unpublished report on "Instinct and the Social Sciences," taking issue with McDougall's viewpoint regarding the significance of the theory of instincts then prevalent for the social sciences. Several years' teaching in small colleges of many and various courses little related to the thesis I wished to develop left insufficient time to complete my investigations. In the year 1917–1918 I found opportunity to reduce in part my accumulated data to manuscript, but the unsettledness and shifting of work consequent upon the war prevented completion. The grant of an Amherst Memorial Fellowship in Social Psychology for the year 1920–1921 (it was not possible to avail myself of the fellowship until a year later) enabled me to make additions and in a measure to complete the task. After some further delay the work is offered to the public, essentially as written in 1922.

In the years since 1909 numerous investigators have become interested in the subject of instinct and various articles and books have appeared setting forth views more or less similar to my own. My own critical and constructive findings on the topic of instinct have appeared in several book reviews, especially in the *American Journal of Sociology*, since 1911, in papers before the annual meetings of the American Sociological Society, in several articles, and particularly in the

Psychological Review for March, 1921, in an article entitled "The Misuse of Instinct in the Social Sciences." The present volume is in agreement with the views set forth in the previous publications.

I should like to disclaim any intention of covering all aspects of the subject of instinct in this volume. I have not had the time nor the facilities for making laboratory investigations of specific instincts, such as will be carried on by the neurologists and animal biologists in the near future. Studies of this kind scarcely exist as yet. If the results of such studies had been available my task in doing what I have undertaken would have been much lightened. This type of investigation is a coöperative labor which will occupy the time of many investigators for many years. My particular problem grew out of the necessity of accounting for the traits of people functioning in a social environment as a means to the establishment of a theory of the organization and control of conduct. This is a problem which presses with peculiar insistency upon the sociologist and the educationist. It is only because the biologist had so evidently failed to offer dependable conclusions for human society and the psychologist had not yet attacked the question with insight and earnestness that it became necessary for the sociologist to enter the field to secure the information which his special science so urgently demanded. My investigations have been primarily from the angle of social psychology.

The method used in this study may be regarded by some as largely negative, although positive conclusions have been reached and much of the treatment, especially that which is concerned with neurological data, is of a positive character. Some of the data used are still more or less controversial, but this cannot be avoided in the study of a subject which is itself as yet highly controversial. I am aware that there must be errors, some of them possibly serious ones, in this study,

but these will be detected and remedied. If the solution of the problem can be materially advanced as a result of the present work its object will have been accomplished.

Practically all of the most valuable literature on instinct, especially that which, like the present work, is in the nature of an analysis of the concept, has appeared too late for me to give it adequate recognition in the text. Two of these works, appearing after I had published my conclusions in 1921 and when my material had been essentially organized, should be mentioned particularly in this general way because of their excellence. These are C. C. Josey's *Social Philosophy of Instinct* and John Dewey's *Human Nature and Conduct.*[1] It has been a matter of great interest, through the years since I first became concerned with this subject, to watch opinion in the social sciences gradually reverse itself from the position in which McDougall placed it in 1908 and immediately thereafter. This reversal, still in process, has been particularly noticeable among the sociologists and is beginning to take place among the psychologists, educationists, and economists. One very striking instance is in my mind. In 1911 I had a considerable correspondence with one of our leading sociologists who at that time deplored my attack on the current instinct theory and asserted that a true science of sociology could not be built except upon the basis of the theory of the instincts as it was then being advocated by McDougall and others, including himself. Recently the same sociologist warned the social psychologists against making a fetich of the concept instinct lest their worship should stir up such just opposition as to bring the whole theoretical structure down about their ears.

The detailed work of this study has been heavy, especially

[1] F. H. Allport's *Social Psychology* appeared after this book was in type. It is not necessary to call attention in detail to the striking similarity of viewpoint regarding instinct and emotion in his book and mine.

in connection with the collection and classifying of instincts, the results of which appear in Chapter IX, and it could not have been carried through except for the assistance of many friendly helpers. I owe much to many persons, but I wish especially to acknowledge my debt of gratitude to Professor Bruce L. Melvin, of Cornell University, formerly an instructor in the University of Minnesota, Elizabeth C. Hayes, of the Child Guidance Clinic of the University of Minnesota, Jessie S. Ravitch, of the University of Minnesota, and Marion J. Bjorhus, of the School of Social Work and Public Health, Richmond, Virginia, all at one time or other assistants in Sociology in the University of Minnesota, and to Miss Lucretia Schroer of the State Department of Education, St. Paul, whose interest in the subject led her generously to typewrite the manuscript. I wish also to express my appreciation to Dr. Howard C. Warren for permission to republish as the final chapter of this book the substance of the article, "The Misuse of Instinct in the Social Sciences," referred to above, and for permission to reproduce some of his own classifications in the text of this work, and particularly to the Amherst Memorial Fellowship Committee, to Professor Walton H. Hamilton for his interest and suggestions and for reading the manuscript, to Professor Charles H. Cooley for reading the manuscript and for his generous words of encouragement, and to Mr. John F. Markey, instructor in the department of sociology of the University of Minnesota, for reading the proof and making valuable suggestions.

L. L .B.

Minneapolis, Minn.,
April 3, 1924.

CONTENTS

CHAPTER		PAGE
I.	Introduction—Problem and Method	3
II.	The Controversy Regarding Instinct and Environment	26
III.	The Organic Bases of Action	38
IV.	The Nature of Instinct—Analysis and Criticism	59
V.	The Evolution of Neuro-Psychic Traits—Habits	87
VI.	The Evolution of Neuro-Psychic Controls—Intelligence and Language	107
VII.	Current Usage of The Term Instinct	122
VIII.	The Classification of Instincts	148
IX.	Some Results of Investigation	172
X.	Origins of The Usage of Instinct	221
XI.	Heredity and the Instincts	248
XII.	Conditional Development and Delayed Instincts	268
XIII.	A Reductio ad Absurdum	305
XIV.	Some False Instincts Exposed—Maternal, Paternal and Parental	321
XV.	Some False Instincts Exposed—Play, Fighting, Construction, Etc.	341
XVI.	Some False Instincts Exposed—Analysis of Contents	365
XVII.	Some Further Misconceptions Concerning the Nature of Instinct	416
XVIII.	The Nature of the Emotions	454
XIX.	The Emotions and Sentiments	473
XX.	Summary and Conclusions	509
	Index	535

INSTINCT

A STUDY IN SOCIAL PSYCHOLOGY

CHAPTER I

INTRODUCTION—PROBLEM AND METHOD

§ I

This is an investigation of the relative importance of instinct and habit—of the inheritance and the environmental factors—in the development of social institutions and social control. It has been undertaken with the assumption that the proper determination of this question has very great significance for the development of both a sound social theory and an effective social policy. There are those who hold a contrary view. The relatively uncritical, those whose concern with the problem of character training and social action is immediately practical rather than rigorously scientific, often respond to this question with the statement, "What difference does it make, anyway; it amounts to the same thing in the long run." With their attention upon immediate results they fail to discern the cumulative differences of method of producing social change involved in the environmental and hereditary procedures which modify final results. We might, in a measure at least, disregard the objections of the uncritical who exert little or no positive determination upon long time social policy. But we are scarcely justified in ignoring the statements of those whose concern it is to work with scientific method and establish the norms with which we are to measure and mold social programs and social controls.

Professor Dunlap declares: "At the present time, I can see no way of distinguishing usefully between instinct and habit. All reactions are definite responses to definite stimulus

patterns, and the exact character of the response is determined in every case by the inherited constitution of the organism *and* the stimulus pattern. All reactions are instinctive: all are acquired. If we consider instinct, we find it to be the form and method of habit-formation: if we consider habit, we find it to be the way in which instinct exhibits itself. Practically, we use the term instinctive reaction to designate any reaction whose antecedents we do not care, at the time, to inquire into; by *acquired reaction* on the other hand, we mean those reactions for whose antecedents we intend to give some account. But let us beware of founding a psychology, social, general, or individual, on such a distinction." [1] I cannot agree with this view, but find the interpretation of Herrick more satisfactory. He distinguishes three types of activity, the inherited, the mixed or modifiable action patterns, and acquired automatisms or habits.[2] He says, "Most of our common activities include all three of these types of behavior in varying proportions, and accordingly they frequently have not been distinguished. The first and third types are especially liable to confusion, for both are manifested as stereotyped, non-intelligent behavior. They can sometimes be separated only by a study of their origins; nevertheless this distinction is of great importance, especially to educators."[3] It is true that if we consider the structure of the action pattern only, disregarding for the time being its origin, we cannot easily distinguish instinct from habit, for both are, in their pure form, automatic stimulus-response processes, beginning in definite, well correlated or adapted stimuli, both ending in definite responses.[4] If we were able to locate the inner connecting neurons with reference to the part of the brain or cord through which they pass we

[1] Knight Dunlap, "The Identity of Instinct and Habit," *Journal of Philosophy*, 19:94 (2/16/'22).

[2] *An Introduction to Neurology* (2d ed.), 335.

[3] *Ibid.*, 336.

[4] Compare R. S. Woodworth, *Psychology*, 328.

might have some light thrown on the question, since the habit processes usually pass through higher centers than those made use of by the instincts.[1] But the only sure way of making a distinction is to determine whether the action patterns were determined in the chromosomes or whether they were adjusted in response to the pressures of environment. And this we are not as yet, in many cases at least, able to do. The nervous pathways, or so-called instincts, using this term to represent the more complex inherited activity patterns as distinguished from simple reflexes, have not yet been localized in the brain.[2] And the same may be said of the habits, although certain areas of type activity are known.[3]

It is frequently held that instincts or inherited action patterns do not appear originally in definite form, ready for the task of mediating adjustments of the organism to its environment, but that all instincts must be educated by learning.[4] It may be possible to admit this contention, at least in the main. But such an argument does not establish the identity of instinct and habit. It is rather a denial of the existence of instinct, or at least of definite inherited complex action patterns. Such an admission would establish at once the primacy of environment and habit in the determination of individual character and of social adjustments and institutions. The assumption of this study is that instincts and habits are defined in terms of their neural structure rather than of their value to the organism or society, and that they are to be distinguished from each other by determining their respective origins.[5] It may be allowable also to speak of the mere metabolic instability

[1] Herrick, *op. cit.*, 122, 252 and Stewart Paton, *Human Behavior*, 165; W. E. Hocking, *Human Nature and Its Remaking*, 154, note.

[2] Woodworth, *Psychology*, 293.

[3] *Ibid.*

[4] *Ibid.*, 111. See also Dewey, *Human Nature and Conduct*, 107, and C. A. Ellwood, *Sociology in its Psychological Aspects*, 204 ff.

[5] See Bernard, "Misuse of Instinct in the Social Sciences," *Psy. Rev.* 28:96—119; J. B. Watson, *Behavior*, 184–5.

which urges the organism to action [1] as instinctive, but we can characterize the stimulus response processes, which develop and serve as specific channels or mechanisms for the discharge of this metabolic energy in adjustment to the environment, as definite instincts only when these processes are inherited. Such discharge patterns or mechanisms are habits if they have been built up in response to the resistance of, or in response to the opportunity afforded by, the environment for this discharge.

Thus, it is easier to arrive at a criterion for distinguishing an instinct from a habit than it is to apply it. We have noted the fact that as yet we have not the technique for determining the identity of an instinct by tracing the growth of its neural structure either phylogenetically or ontogenetically. In practice we use the somewhat crude method of observing whether the activity is in existence at birth or appears later without the preliminary signs of learning. These are by no means accurate methods for the determination of instincts. We are more fortunate in using the crude observation method in the positive determination of habits. For, where we observe the activity integrating itself in response to stimuli, as a method of adjusting the organism to its environment, we may safely assume that the resulting action pattern or psycho-physical mechanism is at least in part acquired, although we cannot easily determine the extent to which it is built upon inherited bases.[2] The secondary method of tracing activities back

[1] H. S. Jennings, *Behavior of Lower Organisms*, 284, 286-7; L. J. Henderson, *The Fitness of the Environment.*

[2] Watson suggests that habits may be found to consist of organizations of congenital reflexes, but organized in a different way. He says, "We do not hesitate to define habit as we do instinct—as a complex system of reflexes which function in a serial order when the organism is confronted by certain stimuli, provided we add the clause which marks off habit from instinct, viz., that in habit the order and pattern are acquired during the life of the individual animal. After habits are perfected they function in all particulars as do instincts."—*Behavior*, 184–5. Compare Woodworth, *op. cit.*, 328.

through lower animal forms, to discover if there are corresponding definite and apparently unlearned action patterns in these primitive types, offers much valuable collateral evidence in distinguishing between instinct and habit. But clearly, for the present at least, the most fruitful source of distinction comes from the study of environmental pressures at work, with a view to observing just how the action patterns arise. Because the environment is open constantly to observation and its action is capable of analysis and measurement, while we cannot yet reach the inner tissues and structures of the nervous system in action, we may expect a much more intensive study of environment in the future with this object of definition in view.

It is precisely because Professor Dunlap is thinking of the action pattern merely in terms of structure, instead of in terms of origins, or, as he says, in terms of its antecedents, that he is unable to find a working distinction between instinct and habit. Long ago we learned that we do not content ourselves with the anatomy or cross section view of any subject or organ or organization. We are primarily interested in what the thing does, although a study of the anatomy or structure may be of the greatest value in solving this problem of function. Function and origins are inseparable in our thinking. We do not study things in isolation, as entities, so much as we study them as parts functioning in a developing system. We have progressed from a world of static logic and metaphysics to one of dynamics, where we speak of evolution instead of creation, of conduct rather than of being, of behavior in the place of mind or soul. We now define a fact largely in terms of its function in the process before us. We examine it, not alone in terms of its structure or organization, but we study its origin and its application and we consider that we do not comprehend the one until we have discovered the other. Professor Dunlap admits that when we look at an action from the standpoint of

its antecedents we call it an *acquired reaction.* This sounds very much as if he believed that all complex activities are acquired, that is, that all action patterns as they function in practice are the result of adaptation to environmental pressures which determine the final form of the mechanism for energy release.[1] In the last analysis, for the human adult at least, this is probably approximately true. But it does not lessen the value of the distinction between acquired and inherited reactions. It merely emphasizes the preponderant importance of environment, especially, in the modern industrialized and cultural world, of the psycho-social environment, in molding character and institutions. And, likewise, it points the moral for the study of environmental pressures as a means to understanding the nature of our institutions and as a method for the control and intelligent direction of their growth. The discovery of the method of habit formation and integration will uncover the technique of institutional organization and control. The two are respectively the individual and collective aspects of the same facts.

§ II

The uncritical assumption that instinct dominates the formation of habits and determines the character of institutions[2] is due to the dominance of the biological viewpoint in modern mental and social science. The spectacular and transforming discoveries of Darwin and his contemporaries and successors, including Huxley and Hooker, and Weismann, Mendel and DeVries, as well as of the large body of more recent biologists with their advanced and accurate methods

[1] This appears to be the view of Professor Hocking (*op. cit.*, 151 ff.); also of Professor Dewey (*op. cit.*, 107).

[2] This viewpoint is emphasized by McDougall, *Introduction to Social Psychology* (8th Ed.), 44, 176 ff. Compare also Paton, *Human Behavior*, 165, 193, 338; Herrick, *An Introduction to Neurology*, 82; Kempf, *The Autonomic Functions and the Personality;* and the psychoanalysts and the educationists generally.

of research, are responsible for this dominance. Their brilliant work, bringing as it did and does the accuracy and insight of scientific method to bear upon problems nearer that of human destiny and control than the earlier work in physics, chemistry, astronomy and geology had done, captured the imaginations of men and gave the views of the biologists a prestige which it is difficult to overestimate. Only the rise of an accurate and extensive method in the field of the mental and social sciences in this day, bringing the application of scientific procedure still nearer home to man's dominant survival interests, has been able to rival the work of the biologists in strength of appeal to human interest. But even here, in the sciences dealing with man's behavior and collective organization, the biological method and principles have been dominant in directing technique and conclusions. This is partly due to the fact that man is himself an animal and is therefore subject to the laws of biology. But it is also in large measure owing to the fact that in our struggle to achieve generalizations and for economy of procedure in a new science we carry over by analogy the conclusions of one science into another. Just as we have an almost irresistible tendency to reason by analogy, so also do we tend to build up sciences by analogy with other sciences previously established.[1]

A companion factor in establishing the dominance of the theory of instinct determination in the mental and social sciences has been the narrowed viewpoint of the biologists who have provided the social theorists with their biological data. Almost exclusively their studies have dealt with types lower in the animal scale than the vertebrates, and for the most part they have confined their attention to the most primitive forms of life. Consequently they have unduly simplified their problem when they come to draw conclusions

[1] See E. A. Ross, *Foundations of Sociology*, chapter on "Social Laws," for a discussion of this fact.

applicable to man. As a matter of technique their procedure has been wise, considering what, as biologists, they wished primarily to do. In no other way than by studying the lowest and simplest forms of animal life could they work out the elementary biophysical and biochemical processes that are basic to animal organization and behavior. But, while man may be presumed to be subject to the same physical and chemical laws of growth and action, his organization is much more complex and variable. The adaptations which he is compelled to make to his environment are much more numerous, rapid and complicated. His effective environment is itself infinitely more extensive than that of the lowest organisms, for it is dominated by the psycho-social environment which does not exist for the lower organisms, except indirectly through the mediation of man. Consequently, the category of instinct, which serves very well for purposes of describing the activities of lower organisms, proves to be entirely inadequate for an account of human social behavior. Only habit and constantly and easily modified acquired reactions can serve his complicated and voluminous adjustment needs. Man's behavior must be flexible in the extreme, while the behavior of lower organisms can be classified according to much simpler and unilateral types. That is why man possesses what we call a mind, which, interpreted from the standpoint of the behaviorist, is a highly complicated and sensitive machine adapted to registering even the faintest and most remote phases of environmental pressures and to adapting the organism to them. The growth of civilization has added greatly to the complexity and sensitivity of this mechanism by giving it a much larger structural complexity and interchangeability of parts. It can do its work only on the basis of acquired reactions. The instinctive mechanism is too stiff and unadjustable. Consequently, the later stages of the growth of mind and mentality in the animal kingdom

have, neurologically speaking, been away from the rigidity of fixed instinct or inherited neural connections, toward a flexible type of synapse with highly complicated dendritic and axonal connections,[1] and toward an acquired adjustment content dominated by interchangeable symbols,[2] psychologically speaking.

It is just these facts which the biologists have failed adequately to appreciate. Impressed with the reflex and tropistic character of the behavior of lower organisms they have assumed the same explanation of the behavior of higher organisms, including man, to hold true. Doubtless reflex and tropism are basic to human activity, just as they are to the behavior of sub-human types. But the greater synaptic flexibility and habit-forming power of man render it possible for him to build his behavior patterns very extensively upon this foundation, with the result that the instinctive element in action is largely lost in the larger volume of superimposed acquired behavior content.[3] The biologists have failed to recognize the fact, because they have known very little in detail about the content of the psycho-social environment.[4] The paucity of their respect for sociology has been equaled only by the smallness of their knowledge of what it has to offer in the way of an environmental analysis. Their approval of psychology has been limited primarily to its biological aspects. Justly repelled by the abundance of metaphysical elements in the mental and social sciences, which have survived longer here than in the field of biology, they have been too ready to question the possibility of any positive scientific light coming from them, especially from the environmental side. The naïve partisanship of the biologists for the

[1] See Herrick, *op. cit.*, 44; Woodworth, *op. cit.*, 416–18.

[2] W. A. White, *Mechanisms of Character Formation*, 108–116, 313, 318, 333.

[3] See Hocking, *op. cit.*, 30, 171 ff.

[4] See Francis B. Sumner, "The Organism and Its Environment," *Sci. Mo.*, 14: 223, 228, for a confirmation of this view.

instinct interpretation in psychology and for the eugenic program in sociology has sometimes been pathetic. It reveals equally an appalling ignorance of the facts of sociology and social psychology on the one hand, and a profound dogmatism and cocksureness about a matter (instinct or inheritance determination of human social and moral traits) which has no better foundation in theory to support it than a crude analogy. In this analogical assumption the biologists have been guilty of a method of violating the canons or tests of scientific truth for which they have strongly condemned the sociologists.

Not only have the biologists been guilty of the unpardonable sin—a sort of sin they will not condone in the sociologists—of reasoning by analogy in attributing, without detailed investigation, to the complex, flexible, habit-forming human nervous structure the same instinctive organization which they have actually found in the lower organisms; but one suspects that they have allowed their unconscious prejudices to distort their scientific perspective. Not being Freudians and not finding any evidence of the Freudian conflict-neurosis among the lower organisms (Freud says only man develops the type of mental conflict which produces neurosis, consequently only man suffers from neuroses[1]), they perhaps are not sufficiently aware of the way in which a mere association of words, calling up an unpleasant or rejected idea, may remain unanalyzed and stand for an argument. The particular subconscious confusion which it seems not unfair to attribute to the biologists in this connection is the subconscious tendency to identify the concept of the influence of the environment upon the somatic organism, especially in the matter of neural dispositions and ideas, with the old and discredited doctrine of the inheritance of acquired characteristics. The distinction is clear enough if one devotes a very

[1] Freud, *A General Introduction to Psychoanalysis*, 358.

small amount of thought to it; but the phraseology has some points of superficial resemblance. The word environment itself has attached to it a high degree of dynamic quality, or contra-suggestibility, especially in the mind of the biologist, where it is almost symbolic of the theory of the inheritance of acquired characters. This fact alone would serve in many cases—especially in those cases where there were few analytical and positive data regarding the nature of the environment and environmental pressures and their mode of operation upon the organism—to arouse the subconscious prejudices of the biologist and cause him to reject any further consideration of the claims of the environmentalists.

Also, the influence of the psycho-social environmental pressures is primarily and directly upon the mental—both conscious and subconscious—organization of the organism. The immediate and direct results of institutional and other psycho-social pressures operating upon the organism are not usually visible to the eye, because they are ordinarily mental rather than physical. These hidden psychic responses of the organism to the psycho-social environment have something of an air of mystery about them. They come silently and imperceptibly. Superficially they are more like the inheritance traits than the gross or visible acquired surface traits; for they too are internal and their method of development is not subject to sensory perception or to processes of inference based immediately upon sense perceptions. Psychologists are just beginning to study, in a specific and quantitative way, correlations between psycho-social environmental pressures and the acquisition of mental, moral and social traits. Except for some rather vague and general statements regarding suggestion, imitation, and reasoning, which have not been definitely connected up with a theory of environmental pressures, little has yet been done in the way of uncovering the technique by which the neural organization responds with action and idea patterns

to the pressures of the environment.[1] Even in the minds of trained scientists, especially outside of their immediate specialties, judgments and attitudes are determined largely with little or no rational analysis, and primarily on the basis of preconception or subconscious mental organization and suggestion. Hence the analogy of the internal character of the mental responses with the chromosome-determined inheritance characters—an analogy largely symbolized by the word *internal*,—in contrast with the gross externality of obviously acquired physical somatic traits, would serve to settle the classification of the mental, moral and social traits in the minds of most biologists. For most biologists—and for the psychologists and sociologists taking their cue from the biologists—these traits still remain in the category of the instinctive. However, it is only a matter of justice to say that an ever increasing number of biologists are analyzing their human data more carefully and are coming to recognize that what we call mental and social phenomena are of a higher degree of complexity and of flexibility of organization than those which we ordinarily call biological.[2] Few biologists would now make use of the methods of reasoning employed by C. B. Davenport, which led him to include human social and moral traits as well as the physical or biological under the category of inherited unit characters.[3] The orthodox biologists and their followers among the psychologists and sociologists have not yet advanced sufficiently from the methods of analogical reasoning

[1] The psychologists are beginning to include chapters on this subject in their text-books. See, for example, Woodworth, *op. cit.*, ch. 13; Watson, *op. cit.*, chs. 6–8.

[2] An example of this sort of analysis, although somewhat crudely done, is to be found in H. W. Conn's *Social Heredity and Social Evolution* (1914). Conn's inadequate preparation for this type of analysis is shown by his constant confusion of instinct with habit.

[3] See his *Heredity in Relation to Eugenics* (1911), especially ch. 3. See also Kellicott, *The Human Direction of Social Evolution* and the writings of H. H. Goddard, for similar examples of these methods of analysis and inference.

to those of careful analysis of more fundamental relationships to discover a more marked underlying similarity between mental, moral and social (internal somatic) traits of consciousness and other (external) acquired somatic characteristics than between the former and the chromosome-determined traits of inheritance. A knowledge of the environment and its methods of control as well as of the mechanics of the egg is necessary to make this transition of perspective.

Without any intention of being presumptuous, it may be said that the intolerance for the environmental view exhibited by the biologists has been due in part, at least indirectly, to the lack of assimilation of the current theory of inheritance from which some of them have suffered. The early education of many of the biologists now writing was not in the theories of inheritance now generally accepted. The Mendelian theory did not become common property until after 1900. The prevailing views on the mechanics of inheritance before and even after that date were much confused and decidedly indefinite. Without the precise knowledge of the mechanics of chromosome determination and egg maturation and of Mendelian ratios, the older biologists confused the period of inheritance determination with the whole of the prenatal period. Inheritance seemed to be limited only by the period of residence in the maternal womb.[1] Even after they had come, under the

[1] The writer recalls an example of this confusion as late as the year 1913, when, at a discussion club program, a Johns Hopkins Ph. D., in biology, then State Entomologist for one of the southern states, argued from the assumption that all prenatal traits are inherited. However, when the error was called to his attention he acknowledged it. The significant point here is not that he did not know better than to confuse the two (for he did, when he was on his guard), but that in ordinary conversation or thinking the true interpretation was so much in the background that habitually he spoke from an earlier and relatively uncritical standpoint of theory. W. M. Feldman(*The Principles of Antenatal and Postnatal Child Physiology*, 642), citing Pfaundler (*Zeitschr. f. Kinderheilk.* 16, 1916), calls attention to the fact of the necessity of computing the age and other measurements of the child from the moment of conception, and not from the moment of birth.

influence of Weismann, to reject the doctrine of inheritance of acquired characteristics, they failed to make a clear distinction between inheritance traits and those traits acquired from the prenatal and the preconceptual environments.[1]

The difficulty lies in the fact that the data of biology have increased too rapidly for the biologists to adapt their previously formed underlying theories and attitudes to them. It is extremely difficult, if not impossible, for the human mind to readjust itself constantly and completely to new data and theories. This readjustment may take place where there is a definite focusing of attention, but it cannot easily occur at the periphery of attention. The outlying or non-focal ideas and theories are left with their old interpretations until they are corrected by use or by being made focal in consciousness connected with some definite problem. The inevitable result of this partial and sketchy readjustment or revision of old ideas and interpretations to meet the implications of new theories is that the thinker unconsciously slips into error and finds himself giving utterance to some discredited theory. This happens even when he really possesses the requisite data for the revision of his theories and in one sense *knows* the newer interpretation. That is, he knows the facts which should enable him to make the revision, but for some reason he has not yet been able to complete the process of reinterpretation in this particular field.[2] This is not an exceptional phenomenon, characteristic alone of the biologists. It is one of the

[1] As careful a biologist as S. J. Holmes fails to make this necessary distinction as late as 1921. See his *Trend of the Race*, 292–3. He speaks of hereditary syphilis on pp. 67, 166 and 307 of this work, although he must know that syphilis cannot be inherited in the Mendelian sense.

[2] An interesting example of this apparent failure to readjust the pattern of thinking to new data is to be found in Professor F. W. Gamble's (University of Birmingham) definition of heredity as "the degree of likeness between parents and their offspring."—*The Animal World*, 230. Essentially the same error is made by Feldman (*op. cit.*, 11) when he defines heredity as "the resemblance between parents and offspring."

commonest experiences in the lives of all people, but it is especially attributable to those who have to deal with a great many new data which call for constant revision of old ideas and theories based on old data to make them conform to the new. Without doubt this factor of the incomplete readjustment of the pre-Mendelian conceptions of the biologists to the new data of students of inheritance, and of environmental pressures, as well, serves to account for much of the confusion in the biologists' minds regarding what is and what is not inherited. It seems especially difficult to explain in any other way their conspicuous disregard of those prenatally and preconceptually acquired traits coming through the cytoplasm rather than through the chromosomes.[1] The chromosome determination operates only at the point of fertilization and cannot operate at any other point or period. On the other hand the prenatal environment is influential throughout the whole period of nine months between fertilization and birth, and environment may be said to operate in a limited way, by induction as it were, even before fertilization. It is this distinction which has not yet become so persistently present in the thinking of the biologists as to steer them adequately clear of errors of interpretation.

The proper approach to the estimation of the relative importance of inheritance and environmental transmission in the building up of the character of the human individual is through embryology, psychology and sociology, rather than through general biology. A knowledge of the mechanics of the development of the ascidians or of artificial parthenogenesis, however thorough it may be, is not an adequate preparation for a judgment respecting the origin of human traits. Such a wide gulf as that lying between the human young and the behavior

[1] See E. W. MacBride, "The Inheritance of Acquired Characters," *Science Progress*, XV, 397; Julian S. Huxley, " Some Implications of the Chromosome Theory of Heredity," *Science Progress*, XVI, 238–9.

of the lower organisms, such as that here mentioned, can be crossed only on the uncertain bridge of analogy. The students of human embryology are much more friendly to the theory of the acquired origin of human traits,[1] because they deal with the prenatal development of the organism and its environment in operation. However, only the minor portions of the human acquired traits come before birth, and these are biological rather than mental, moral and social. The really important source of acquired human traits is the postnatal psycho-social environment. Here arise those psychic qualities which exert a predominant influence in adapting the individual to his environment; those qualities which are even immediately most concerned in creating and transforming his environment.[2]

§ III

The present study, relying on the assumed importance of the distinction between acquired and inherited traits, habit and instinct, will undertake a careful definition of the concept of inheritance on the mental side. The concept of instinct will be considered from the various angles of approach which are open, and an attempt will be made to determine the nature and functions of instincts in relation to individual conduct and the social organization. An attempt will be made by the process of elimination to discover the limitations of the instinct concept as an explanatory device, and the functioning of the instincts will be studied by means of the positive tests of application to concrete problems of interpretation.

Following a detailed analysis of the concept of instinct and some study of the functioning of instincts in social organization, an analysis of the process of habit formation would normally be presented. This is a field much less adequately worked

[1] See Feldman, *op. cit.*, 110 ff.

[2] See Bernard, "Neuro-Psychic Technique," *Psy. Rev.*, Nov., 1923 (Vol. 30, pp. 407–437).

than the preceding one, the analysis of the concept of instinct. In the dozen years since the writer first began to collect data regarding instinct and habit the attitude of the psychologists and biologists with regard to instinct has largely been reversed. While at the beginning of this period no voice was to be discovered in protest against the McDougall type of interpretation, which was then dominant, in recent years numerous papers and some books have appeared controverting the older and metaphysical instinct conception. But this work has on the whole, been critical rather than positive and constructively revisionary. It is now time to present a theory of habit formation which should materially assist in finding a substitute for the now largely discredited theory of instinct dominance in character formation.

A third line of investigation, aiming at testing the significance of instinct for character building and social control would be primarily sociological rather than psychological. The proof of the utility of the distinction between instinct and habit must be found in the relative values of the two concepts as explanatory devices. This relative utility can be tested only by using the two concepts in the interpretation of some social institution. For a variety of reasons the family might well be selected for this purpose. The history of the family is perhaps as clearly determined as that of any other social institution reaching back into great antiquity. Also it is a fairly simple institution, consisting of a limited number of functioning members, whose relationships to each other are fairly well defined by biological and environmental necessity. Furthermore, it is known to have passed through reasonably definite stages of development which have a fair degree of similarity for different peoples in the same stages of social and economic development, and under the same environmental conditions. This material of the family may, therefore, be handled with some degree of precision. It should afford a fairly adequate

test of the truth of the rival claims of heredity and environment at a time when the history of social institutions is as yet too inadequately developed to render the test equally successful with respect to any one of them.

Owing to limitations of time for making this study and of space for publication, only the first of these three lines of investigation has been carried to completion in the present work. Properly each of the three divisions should have a separate volume devoted to its exposition, if the most conclusive results are to be secured.

§ IV

In the study here presented a definite and logical line of development has been followed. Chapter I states the problem and sets forth the method. This chapter also establishes the fact that there is an urgent problem to be investigated. The second chapter states in a preliminary way the opposing points of view of the instinctivists and the environmentalists. Chapter III traces the development of the nervous system phylogenetically with the purpose of showing that the higher brain organization, which is the seat of directive intelligence, and which possibly was developed to serve the lower or instinctive centers of the autonomic system in realizing their functions or ends, has come in the more advanced human epoch to be under the dominance of man's psychosocial environment, which we call civilization. Thus instinct has been replaced by convention and science in the control of character development and individual adjustment. Chapter IV represents an attempt to establish a definition of instinct sanctioned by the most authoritative contributions to the subject as a point of departure for the remainder of the book. The author's purpose here has been to forestall the possible charge that he has set up his own unsanctioned definition of instinct in order to knock it down with pointless arguments.

The orthodox character of the definition of instinct adopted should command all the more respect for the criticism herein advanced of those expositions of the functioning of instinct in society by writers who violate their own accepted definitions. The two following chapters give an account of the origin and growth of the psycho-social environment as the projection of that very intelligence which originally served the impulses of the lower nervous and bodily organizations. It is the history of the Frankenstein which overcame its creator.

The three subsequent chapters constitute an exposition of the current employment of the concept instinct and contain the major portion of the concrete results of the investigation. The purpose here is to show both the great variety of usage and the almost universal lack of critical standards. This could be demonstrated vividly only by means of an extended analysis of the literature employing the concept instinct. Chapter X explains how the present uncritical and irrational employment of the concept came into existence and was handed down to us as one of our intellectual traditions. The following chapter shows that instincts cannot be conceived as existing apart from the structural organization of biological heredity. Failure to recognize this fact has been responsible for much of the erroneous usage from which social psychology now suffers. The next chapter brings into relief the environmental factors in ontogeny for the purpose of setting them in contrast to the inheritance factors with which they are so commonly confused. The limitations of instinctive control of the development processes cannot be adequately appreciated until the nature of environment is understood. The four following chapters (XIII–XVI) inclusive, are devoted to an analysis of certain typical so-called instincts of complex character on the basis of the criteria established in preceding chapters. The net result is to demonstrate the untenability of the concept of instinct which these types imply. The seven-

teenth chapter examines certain residual misconceptions regarding the nature of the instincts which were not adequately treated in earlier chapters. Two additional chapters on the emotions and sentiments (Chapters XVIII and XIX) have as their object to show that emotion and the affective life in general are not exclusively instinctive in character, as is now generally assumed by the prevailing social psychology. Here, as in other aspects of the mental life, the acquired elements are dominant and directive. The final chapter summarizes the argument of the book as a whole and restates its conclusions.

§ V

It is the belief of the writer, intensified by some twelve years of intermittent attention to the subject and by observation of the phenomena of instinct and habit, that an adequate control of social progress and of social and individual welfare lies mainly through the analysis and organization of the environment instead of through the control of heredity, although the latter is also important. So far the major employment of the concept of instinct by the psychologists, educationists, and sociologists has been mainly negative rather than positive. These thinkers have gone but little beyond a hypothetical definition of the limitations to individual development and social progress under the instinct dominance of individual character formation. There has been some theorizing with regard to the possibilities of the combination and utilization of native or instinct tendencies in action and the Freudians have had much to say about the evil of baulking or repressing instincts, and something about the possibilities of the sublimation of instinctive trends. All of these discussions might be expected ultimately to bear some fruit in the organization of social controls and social and ethical standards, provided we could determine the true nature of the instincts. As yet we are hopelessly at sea as to what the instincts are, and no other

group of thinkers is quite so hopelessly without line or compass in this respect as are the educationists and the Freudians themselves.[1]

The more positive and fruitful method of utilizing the instincts for purposes of rational and progressive social control might, perhaps, appear to many to lie in the direction of a rational and purposive breeding of instinctive tendencies. This, however, must necessarily be a very slow process, even if it were technologically feasible. If instincts can be bred at all—at least instincts of any considerable utility to man in his more advanced struggle for the control of civilization—the length of time required to render this method of social improvement effective would be almost prohibitive. Even under the most favorable conditions for the propagation of new or valuable instinctive attitudes—that is, if no prejudices existed against the untrammelled breeding of human beings for desired traits; if the traditional family relationships, marriage, jealousy, domestic property ties and the like did not exist—it would require hundreds or even thousands of generations to spread abroad throughout the earth by means of inheritance those traits most desired. In the absence of some system of elimination of those who possessed undesirable traits or of the prevention of the transmission of their traits through reproduction, the period of time required for the selection of a perfect race through control by inheritance, even where the valuable traits were able to compete successfully for survival in natural as distinguished from social or controlled struggle, would be almost infinite. In other words, the only way in which the inheritance or eugenic method could be rendered ultimately effective as a means to peopling the earth with a desirable type possessing the proper instincts would be through an environmental or euthenic control of the proc-

[1] See Bernard, "Instinct and the Psychoanalysts," *The Journal of Abnormal Psychology and Social Psychology*, Jan.–March, 1923.

ess which would make such a breeding or eugenic control possible. Thus, eugenics cannot be made to operate successfully, even where it is possible to make use of the technique, without the aid and support of the euthenic or environmental method of social control. The eugenic or inheritance method of race improvement is not self-directive and self-executing.[1]

The environmental method of social improvement and control operates much more rapidly. It is capable of being used in lateral as well as in longitudinal transmission. Those traits which can be transmitted by means of teaching or other environmental pressures or technique can, if the desire is sufficient and if the organization is adequate, be spread over the whole world in a few generations at most. There are no impassable inherent biological or physical barriers to such transmission. Consequently, if it be found that the environment, especially the psycho-social environment, is the chief source from which new and valuable traits to be used in social improvement and social progress must come, the problem of the sociologist and of the social legislator and educator (in the broadest as well as in the narrowest sense) will be greatly simplified. The method of social advance and of social control in the future will be determined by a close analytical study of the environment, and by the application of the principles discovered to the control of the social situation. If it should appear from our study that the forms and organization, and even the functioning, of the institutions have in the past uniformly borne a close relationship to the physical, biological, socionomic and psycho-social environments in which these institutions are cast, the implication should be fairly clear that the chief constructive task of social science to-day is the discovery of the methods or technique by means of which this correlation between environment and institutions is maintained. This sort of study of environment,

[1] See Conn, *op. cit.*, ch. 11.

especially in the second and third phases here outlined, should be able to make a significant contribution in this direction. In the second method of investigation referred to above the analysis should cover the psychic transformations within the individual which are essential to the readjustment of institutions. For institutions are the abstractions of the organized functioning of individuals and not things apart from individuals. The third method should present a typical analysis of the coöperative and differential adjustments of individuals to a predominantly common environment with the intent of discovering the principles by means of which these coöperative and coadaptive adjustments are made.

CHAPTER II

THE CONTROVERSY REGARDING INSTINCT AND ENVIRONMENT

There are two well-defined viewpoints in the social sciences regarding the importance of a theory of the instincts as a basis for the development of social theory. One group of writers and teachers contend that the instincts are of secondary importance in the motivation of social conduct and in the organization of institutionalized controls. They maintain that whatever instincts man possesses are too elementary and too decidedly biological in character to be primarily determinative of his social adjustments. They hold that the instincts are merely contributory, affording a basis for the building of this or that adaptation or for modifying some learned adjustment. They contend that the adjustments of a socialized or civilized individual to his social environment are the result primarily of experience—either of contemporary experience rationalized into a present-day adjustment, or of tradition embodying past experience or social selection acquired in the past and held intact by strong prejudices or convictions passed down from generation to generation. Civilized man, they hold, is a cultivated animal living in an artificial construction, society. This artificial organization, human society, is constantly becoming more artificial and derivative, even to the extent of suppressing in large measure the native impulses of man. Man builds the society which his reason, his fears, his convictions, his experiences dictate. Under the artificial or civilized régime he selects other objects for expenditure of effort than those which would be dictated solely

by his native impulses or instincts, if they were allowed to control his conduct.

Those supporting the opposing view contend that man is still the creature of instinct, although he has learned for the most part to guide his instinctive impulses into more efficient and socialized channels of expression in keeping with the expanded needs of civilization. The obvious reply to this view is that if this language is not a mere figure of speech it must of itself indicate that the instincts do not perform the directive rôle in civilized society, but that man's sense of values, reason, experience, scientific judgment at the best, perform this function by virtue of the fact that they guide the instincts in their expression. Those espousing the instinct theory further point out that man's great historic institutions are the product of the organized struggle for the satisfaction of his organic and animal impulses. They contend, for instance, that his economic institutions have grown out of his organic need for food and that the family is built upon an expanded and rationalized sex interest and upon the instinctive attitudes between parents and children. Other institutions, such as war, they would trace back to an instinct of combativeness, the political state to instincts of fear and gregariousness. In fact, they have an instinct for almost every well defined or institutionalized human activity. They argue that without some such strong organic impulse at the base of each social institution, social continuity would be impossible and the social world would be merely chaos, flitting from one type of organization or disorganization to another. Social conditions, without the cementing powers of instinct, would be so disorganized and social continuity would be so interrupted that the individual would be unable to perceive society as a logical whole. Discreteness rather than organization would be the rule in the social fabric, and variation in social types and practices would be so great from age to age and from place to place that

people could not understand each other or adjust their processes of action. Civilization would be impossible.

To this the opponents of the instinct theory of social organization reply that there is as much unity-compelling power in the environmental pressures which condition the development of a people and of all peoples together as there is in the sort of instincts which the instinctivists proclaim. In fact, they say, peoples do differ in their cultures, customs and institutions largely in response to the environmental pressures to which they are subjected. That there are peoples who do not understand one another, their motives and their manners, is not merely a theory but a reality. On the other hand, if human instincts were so rigid and well developed as to dominate the lives of men completely, all peoples would have to act as much alike as do ants and bees, without much regard to differences in environmental factors. This, they contend, would be a great misfortune, for it would prevent mankind from making such detailed adjustments as the great diversity of climate and temperature, soil, resources, topography and other physical conditions demand, and thereby the range and flexibility of human life would be greatly limited. As a matter of fact, they say, man's instincts are so rudimentary that they do not seriously interfere with the adjustment of his collective and individual activities to the most diverse environmental pressures. Consequently the state, the family, economic organization and procedure, moral standards and concepts and the like, vary from age to age and from place to place to meet the needs and conditions there encountered by men. The fact that all men of any one group in any one time are under essentially the same environmental pressures in the large—physical, biological and social—is quite sufficient to guarantee that they will make about the same general adjustments and therefore adhere to the same typical institutions, permitting only the normal degree of deviation according to time

and place, which is a matter of common observation and experience.

That a great deal of individual variation does occur, even within a limited locality, is well known; and this variation is greater among more advanced than among primitive peoples. This individual variation within limited areas is due, the environmentalists contend, to the uneven incidence of the environmental pressures, to which even primitive man with his relatively undifferentiated social life processes is subject. Modern man is even more liable to be confronted by unequal and unlike environmental pressures. He has facilities for coming under a great variety of physical environmental influences, even at a distance, by means of travel and an abstract comprehension and appreciation of these pressures which are not possible for the lower orders and the less cultured peoples. Although his character may possibly be somewhat modified directly in this way, physical environment usually influences man indirectly through its conditioning pressures upon institutions rather than directly through immediate modification of character or even through the less direct modification of his heredity. The most potent differentiating influence operating upon modern man is the great variety of cultural forces with which he may come in contact through travel and through the spread of the culture carriers in the form of the sciences and literatures. These influence him directly and markedly.

On the other hand, while variations between individuals are more marked in the modern world than among primitive peoples, differentiations between groups have diminished with the passage of time. This fact is to be explained by the widespread intercourse among modern peoples which mitigates the effect of the great differences of diverse physical conditions under which they live. Some have lands adapted to agriculture, others to grazing, others still have an abundance of natural resources, while some live on the seacoast in the line

of the trade routes. Each develops a culture with its constituent institutions and associations in accordance with its environment. But under the influence of an ever-increasing unity of cultural environment arising from contact and from an international literature and science—and also from a quasi-transference of physical environments through travel and economic contacts—these national or group traits indigenous to their own particular environment and growing out of the adjustment of their peoples to their environmental limitations, tend to be diminished or to disappear. The environmentalists further point out that if by any chance a people occupy a territory with a variety of physical and economic environments, they do not possess a complete unity of culture, even though they should be of the same racial descent and therefore should possess the same native instincts. Since the coming of modern facile means of communication and transportation, the disunifying effects of varied physical conditions have, however, been mitigated. This, it is obvious, is due to the greater unity induced in the cultural environment bearing upon each individual, brought about through the fusion of underlying physical and social pressures, since the inherited factors or instincts remain the same.

Thus the environmentalists admit the contention of the instinctivists that the instincts afford a basis upon which man's adjustments to his social environment are made. They also admit the contention that man's great historico-social institutions, at least in their earlier stages of development, have arisen out of the endeavor to satisfy organic and animal impulses. But on the other hand they deny that these adjustments of man to his social environment are, in their more complex or institutional aspects, themselves purely instinctive acts or processes. The institutions are not now, in their present-day highly developed forms, mere simple and direct reactions to the organic needs of man. They are exceedingly

indirect responses thereto and are in the main controlled either by ideals and highly conscious aims or by tradition, custom and convention rather than by simple appetites, as would be the case were they directed merely by instinct. Commerce and finance, though originating in the dim past from the need for food and the other physical wants of existence, are now only too often carried on to the confounding of empty stomachs and the piling up of bank accounts. Although the family may have originated in the sex impulses, it has grown so far away from its point of origin that the state demands that the satisfaction of sex desires be made secondary to the more rationalized interests of the family, including offspring, and of society, where the two aims conflict. It is therefore, according to the environmentalists, the social and institutional environment, that is, the psycho-social environment, rather than instinct and appetite, which functions primarily in modern civilized controls.

Those representing the two views concerning the importance of instinct here set down in opposition to each other have different objects in view as well as, in the main, different conceptions of the nature of instinct itself. They represent opposite types of determinism and not, as has sometimes been said, the conflict between determinism and non-determinism. We have heard much about economic or environmental determinism to which the one group of thinkers adheres. The instinctivists constitute a group adhering with equal tenacity to biological determinism. The biological determinists believe that human society is what it is primarily because of the inherent nature of man, although they make allowance for some modification from without. The environmentalists maintain that human society is what it is primarily because of the conditions under which man lives, although they do not deny that inherent characteristics necessarily place limits to extremes of social

and individual development under the pressures of diverse environments. The biological determinists are sometimes called the conservatives of social science, because they deprecate attempts to disregard "orignal nature" or the instincts, and refer to reformers of a radical sort as idealists, zealots, demagogues, bolsheviks, anarchists and the like. They maintain that man's organized contacts and fundamental relationships are basically the same in all times, and that it is futile to seek to disregard the limitations set by "orignal nature" in planning a social order. Some maintain that we have gone too far in this direction now and that we should go back to "fundamental" types of adjustment, rather than forward to new evils. They even condemn much modern effort to establish an ameliorated social order, including charity and institutional care, and even in some extreme cases, the soft virtues of Christianity, maintaining that only a rigid selection on the basis of primitive biological values will benefit the race in the long run. In its extreme and most uncritical form this biological view of society becomes the cult of the Nietzschean super-man, or of the ruthless group selection and military survival of the fittest set forth by the Bernhardis and similar preachers of salvation by the sword.

Often, like their opponents, the biological determinists use the same argument to justify decidedly contradictory policies. For example, one group of instinctivists maintains that the "maternity instinct" and the "instinct of monogamy" demand that woman give up her attempt to get out into the world and sever her ties with the traditional home.[1] While another group maintains that the dominant rôle of the "reproductive instinct" and the "male polygamous instinct" rebels against the restraints upon sex freedom, to which mischievous, artificial modern religion, science and morals have subjected

[1] For this point of view see W. C. D. and C. D. Whetham, *Heredity and Society*, esp. chs. 6–8.

us.[1] Likewise private property, organized society, the truth of historic religions, the canons of art, individualism and anarchism, socialism, and almost every other "ism," are both condemned and justified by means of an appeal to the reputed instinctive nature of man. Obviously, what adherents to this brand of determinism hope to accomplish in social control through the propaganda of their type of determinism depends primarily upon what their reason, traditions and experiences (themselves forms of environmental pressures or the products of such) have taught them to consider desirable. One cannot avoid observing that a conscious ideal or principle or convention has justified the social or individual "necessity" of monogamy, or of freedom of sexual relationships, or of any other "ism" before instinct is invoked in its support, although in some cases (not in all) the principle may be formulated in response to the demand of appetite or of instinctive impulse. Thus, in the case of so-called instinctive determination of social principles and attitudes, we have an interesting example of the influence of environment itself. The environmental pressures, especially of the psycho-social type, have in reality, in many cases at least, determined what the instinctivists wish society to be and have molded their attitudes towards, or theories of, the instincts and their importance accordingly.

The environmentalists contend that within certain limitations set by human intellectual capacity and physical energy on the biological or inheritance side and of physical and social conditions on the environmental side—both of which types of limitations are vast in the aggregate—man may in the long run make his own world. They say "in the long run," not in a day, for one of the environmental factors which must be contended with is the psycho-social environment, which arises out

[1] See Nietzsche, *Will to Power*, etc.; also Bertrand Russell, *Political Ideals*. *The Dial* characterizes Thomas Hardy as holding that "the fundamental, elemental relation between man and woman is the only relation which, in the end, profoundly matters."—*Loc. cit.*, 63:222.

of the past as well as the present. This great body of tradition, custom, conventional attitude and opinion can be moved and changed but slowly. New ideas, however scientifically justifiable and defendable, once injected into the body of the cultural environment take effect and work a transformation only by degrees. Our means of communicating ideas, vastly developed and improved in recent centuries and decades, still are far from perfect. Also, the soil for propagating new ideas is poor, because our educational system does not as yet sufficiently emphasize training in science, especially in the social sciences, for the masses of mankind. Likewise the physical environmental limitations, which translate themselves at the margins of social adjustment into economic terms, oppose a definite barrier to rapid transformation of social structure and aim. When it is remembered, we are told, that man has been socially conscious, that is, reflective about his institutions and their directive power over him, only a short period of his history and has therefore but recently learned to plan for social reorganization and readjustment, it is not surprising that more radical changes have not been made. Thus the psycho-social environment, in the form of customs and institutions, has almost the tenacity, rigidity and endurance of true instincts.

That certain institutions, such as the family, the state and private property, may never be dispensed with in human society, regardless of what other changes may take place, would be admitted as a possibility or even as a probability by the environmentalists. They would deny, however, that the stability and permanence of such institutions are due wholly or even primarily to the presence of instincts in man which demand these institutions for his subjective satisfaction or which rigidly organize his activities in ways which constitute collectively these social institutions. They would explain this imputed permanency of institutions as being due to the fact

that the conditions of human existence—economic, political, biological and the like—are fairly constant and that therefore survival in the world in which we find ourselves is best promoted by means of such relatively continuous and permanent institutions. The environmentalists would go even further and contend that whatever instinctive or subjective adjustments of an inherited character we have in these institutions, whether primitive or recent, were developed through a selective process as a means of adaptation to these environmental pressures. In fact they would consider our development of these types of institutions as a selective and survival process, somewhat biological and hereditary in nature, but primarily of a social and rational, or at least experiential, adjustment character. The institutions themselves merely had their inception, in their most rudimentary forms, as unreflective attempts to satisfy instinctive demands or needs. They were developed and perfected through the accumulation of experience on the one hand and a sort of blind selection and survival of the fittest among adjustments on the other; and the term fittest here refers to the demands of the environment as well as to those of the individual.

To the environmentalist the problem of what changes can in the future be made in the structure of society, in its institutions, does not depend for its solution primarily upon the extent to which the instincts can be modified. This is a secondary question. He takes it for granted that the inborn propensities, in so far as they are specific to any one institution (which rarely, if ever, they are), can be made to conform to a rational organization of society, even of a moral character different from that in which they first appear. The innate limitations which he fears most are the general rather than the specific ones, especially the biological limitations set upon attention, learning, activity, and the expenditure of energy generally. In many instances we already appear to

have reached some of these limitations. Our usual resort in such cases has been to substitute mechanical appliances and technique and natural forces for human activity and energy. To what further extent we can continue to make this substitution does not yet appear.

Perhaps a more serious limitation upon future rational change and social reoganization will be imposed by the scarcity of natural resources, especially of the inorganic resources, such as coal and iron, which are at the basis of our mechanical and industrial development. Also the degree to which the organic environment, especially that of germ life, which contributes so many of the diseases, may be subjected to human control is one of the serious problems of the future of human life and survival, especially as the conditions of living become ever more crowded and the margin between nature's bounty and man's collective needs tends to disappear. The regulation of population in such a way as to strike the most effective balance between production and consumption, not alone of economic goods, but of all values, is an environmental problem which must be met before human progress can be indefinitely extended or even indefinitely maintained. Problems such as these seem to the environmentalist much more important in the matter of future social control than do those relating merely to the instincts or inheritance, especially since he has been taught to regard the contribution of natural selection to human superiority as about completed.

But the environmentalist cannot safely disregard the instincts. Although they are primitive and simple and fixed, changing but slowly—certainly changing but little within the human epoch, and possibly not at all within historic times—their very fixity and settledness constitute them a quantum which he must include in his calculations. From this basic factor he must start in his social analysis and in his program of reconstruction. Also he must recognize that the fixity of

instinct is a statistical rather than an individual fact. Individuals vary, at least to some degree, in their instinctive equipment, while the masses of mankind remain at somewhat near the same average inheritance level. Already attempts are being made to analyze the native equipment of man.[1] There is great need of a corresponding analysis of man's acquired equipment or technique. It is also necessary to work out the method of acquiring characters as completely as the method of inheritance has already been analyzed and synthesized by Mendel and Weismann and their successors.

[1] For two outstanding representatives of two types of emphasis in this analysis see E. L. Thorndike, *The Original Nature of Man*, and William McDougall, *Introduction to Social Psychology*. These books undoubtedly include much that is acquired as well as inherited in their accounts of man's native equipment. This is particularly true of the type of writing on instincts of which McDougall is a leading representative, for his supposed instincts are in reality complexes, in which the learned neuro-psychic organization is predominant.

CHAPTER III

THE ORGANIC BASES OF ACTION

The chief constituent of living matter is protoplasm. In the animal organism this takes on several forms which are more or less closely correlated with the functions of structures. While all protoplasm has the distinction of being more highly or complexly organized and less stable in its organization than non-living matter, certain types of it are much more sensitive to external influences than others. Thus, of the bones, glands, muscles and nerves, the last named are the most sensitive of all and have been specialized to the function of communicating conditions and stimuli from the environment to the body or from one part of the body to another. In the higher living forms the brain, and especially the cerebral cortex, serves as the organ or organization for clearing, connecting and evaluating these transmitted impulses through the animal organism to aid it in making its adjustments to its environment.

Correlated with the irritability of protoplasm is the fact of the self-activity of the organism, due to metabolic processes.[1] The organism is so constituted or organized that it is active. It is never passive, except in death. In its early life the metabolism is especially active and the organism is particularly restless. But it is in this period also that its movements are least accurately and successfully developed or coördinated within itself and with reference to external objects. Its movements are, with some exceptions, what are generally known as random movements. But even at this stage of development

[1] H. S. Jennings, *The Behavior of the Lower Organisms*, 284 ff.; also S. Paton, *Human Behavior*, 163.

the general conditions of movement are fairly well determined, and those conditions of movement which have already been determined at this stage are apparently in the main determined by heredity. The general shape, size, and placement, as well as structural qualities, of the bones, muscles, glands, and the lower neurons are inherited. Action, whether its pattern has been inherited or organized from fixed or random movements largely with the aid of environmental pressures, must make use of these organs or structures. It will be limited in its direction and power by the functional organization and the competency of the structural materials, although this competency is much more susceptible to environmental organization and modification than is the functional organization, at least in the larger and basic aspects. Even such seemingly insignificant details as length of bone, types of joints, which limit or control the direction of movement, or the conditions under which glands are and are not able to secrete, or the fatigue conditions of muscles and nerves, must not be neglected in taking account of the inherited—and acquired—conditions of activity.

The irritability of protoplasm is the quality which enables the organism to act economically and, in the case of higher organisms, intelligently. It not only makes possible the reception of the stimulus which sets inherited action patterns into functional activity, but it also serves as a means by which the grouping or organization of the random or uneconomical movements into functional habits as wholes may take place. When any organ comes in contact with an object this sensitivity or irritability establishes the condition known as the stimulus and communicates the impression to other parts of the organism. This establishes connections throughout the organism, that is, ties it up as a functioning or intercommunicating whole with reference to this object.[1] In this way, the random

[1] C. J. Herrick, *Introduction to Neurology*, 2d ed., 25.

movement, and the metabolic energy back of it, come to be replaced by a definite stimulus-response process utilizing the energy of metabolism. Gradually, as many such acquired connections are made with the aid of the sensitivity and communicability of protoplasm, and as more and more random movements are absorbed and replaced by definite coördinations, the organism becomes a functional unity or functional whole, from the standpoint of acquired action patterns as well as from that of inherited mechanisms. Necessarily, these two types of action patterns—the acquired and the inherited—are developed in fairly close conformity to each other. That is, the habits formed out of random movements adapt very largely to preëxisting inherited patterns, on the one hand, and the inherited patterns are also modified to meet the demands of the environment as expressed through the habit formations.

Needless to say, not all habits are formed in the virgin way here indicated, that is, directly and solely from random movements. Habits are likewise organized out of any smaller units or fragments of action patterns. Reflexes or chains of reflexes (instincts) may be requisitioned in the habit-forming process. Chains of reflexes may be broken up into their constituent parts in order that the new habit construct may make use of such elements as it needs. In the same way, previously formed habits may be utilized as a whole or broken up before utilization. Random movements may perhaps properly be regarded as reflexes, or, possibly, in some cases, as the fragments of disintegrated instincts. But, for the most part, the random movement proceeds from within and is dependent less upon an external stimulus than upon an internal overflow of energy which incites the muscles, or glands, or, perhaps, even the neural processes to random action.[1]

In the higher organisms most of this activity is mediated

[1] For the significance of energy discharge in character organization and development, see Paton, *op. cit.*, 163, 169, 182, 188–9, 192, 198, 333.

through the nervous system, which acts as a carrier or transmitter and transformer of the stimulus. This is not true of the lowest organisms. The muscles and the glands evolved before the nervous system.[1] But as the organism became more complex and as its sensory system rendered it susceptible to an ever-widening environment, the nervous system appeared to facilitate the transmission of impulses and finally to coördinate and control them.[2] The nervous system not only rendered the organism more sensitive to stimuli, but it also made possible a much more rapid and a much more widely distributed transmission and transformation of stimuli into responses. And in the later stages of its development it has made a selective transmission of stimuli highly effective in place of the old relatively more uniform distribution of stimuli to all parts of the organism. Even where there is a tendency to widely diffused distribution of the stimulus through the tissues which function more slowly than the nerves, the greater rapidity of transmission and the greater effectiveness of neurally selected and controlled stimuli easily correct the evil of diffuseness. This control and correlation of neural transmission takes place in the higher nerve centers, in the cerebral cortex of the brain.[3]

This greater sensitivity to stimuli and this greater rapidity, breadth and coördination of transmission of the stimuli are essential to the efficiency of the higher organisms. Their sensitivity to expanded environments, due to primary and secondary (cultural multiplication) developments of the senses, renders it possible and necessary for them to handle a much greater volume of stimuli in a much shorter period of time and much more accurately. This fact may be illustrated especially from the life of man. The environment which presses down upon him offers him an enormous volume of stimuli from all directions. He has so multiplied the mechan-

[1] *Ibid.*, 45. [2] *Ibid.*, 46–7, 54–5, 82, 106, *passim.* [3] Herrick, *op. cit.*, 341.

ical and psychological aids to perception that he is literally swamped by the pressures of his social, and especially of his psycho-social, environment. As a result he must meet situations rapidly and accurately or fall behind in his competitive struggle for advantage, or even pay the extreme penalty for incompetency with his life. What is true of man is less characteristic of the animals below him, but it is the more nearly true of them in the degree to which they approach his plane of development.[1]

In man relatively few significant activities take place without neural mediation and these are primarily visceral. Herrick points out that, "Many of the visceral functions can be performed quite apart from any nervous control whatever by the intrinsic mechanisms of the viscera themselves." [2] Among these may be mentioned the automatic heart beat, the ordinary processes of digestion, the secretive action of the pancreas, and the interfunctioning of uterus and ovaries in menstruation.[3] But while the nervous system is not dispensed with in any considerable number of important cases, it is by no means the sole functioning agent in most cases. The physiologist and the psychologist are learning to take into consideration many conditioning factors in activity, especially the secretions of the glands and the available energy supply from metabolism. This recognition has not always been given. As Paton says, "Practically no attention was (formerly) given to the fact that such organs as the liver, suprarenals, thyroid, and sexual organs, by the effect of their secretions upon the activities of the nervous system, influence the sequence of the moods, trains of thought, and general trend of activities." [4] Paton is corroborated in this respect by Her-

[1] Compare Herrick, *op. cit.*, 121, 328.

[2] *Ibid.*, 249.

[3] *Ibid.*, 249, 262, 268; also J. L. Mursell, "The Ontogenetic Significance of Instinct, Habit, and Intelligence," *Psy. Rev.* 29:170.

[4] *Op. cit.*, 163; also 169, 182, 188, 192, 198, 333.

rick who states that, "the visceral functions as a whole are of enormous importance, not only in the maintenance of the physical welfare of the body, but also as the organic background of the entire conscious life." [1] These are facts which have been emphasized especially by the newer physiology and the newer psychology, not neglecting those who have worked in the somewhat amorphous field of endocrinology.[2]

The nervous system is generally divided into two great divisions, "the *central nervous system*, or axial nervous system, comprising the brain and spinal cord, and the *peripheral nervous system*, including the cranial and spinal nerves, their ganglia and peripheral end-organs, and the sympathetic nervous system." [3] Within the peripheral nervous system lies what has sometimes, especially more recently, been called the autonomic nervous system,[4] because it functions primarily automatically. It is an older phase of the two systems and came into existence as a means to helping the organism make immediate and direct adjustments to its environment. It has been called the vegetative system by some investigators in recognition of this direct function and has been divided into the vagus, the sympathetic and the sacral systems.[5]

[1] *Op. cit.*, 249; also 288.

[2] *Cf.* Paton, *op. cit.*, 251 ff.

[3] Herrick, *op. cit.*, 114.

[4] See E. J. Kempf, *The Autonomic Functions and the Personality*, part 1, for his argument regarding the extent and importance of this system.

[5] J. W. Bandler, *The Endocrines*, 280–3; also Eppinger and Hess, *loc. cit.* Kempf (*op. cit.*, pp. 9–11) says, in this connection, "The autonomic apparatus, in this study, is considered to include the digestive system with its secretory glands and the liver for the intake, assimilation, and storing of energies (glycogen) and the elimination of waste products; the entire circulatory system and the kidneys and sweat glands for the circulation of working supplies and the elimination of endogenous waste products; the respiratory system for the necessary intake and elimination of gases; the sex organs and pituitary glands for reproduction and growth of the body; the glands of internal secretion, such as the adrenals, thyroid, parathyroids, for the regulation of metabolism in emergencies and otherwise; the unstriped parts of the skeletal muscle cells which maintain the postural tonus of the muscles and contribute largely to the ex-

This system is built around the vital functions. It literally grew around the digestive tract, the respiratory and circulatory systems, the reproductive and excretory apparatuses and finally the lower exteroceptive senses. Paton says of it that it "still has very important functions to perform in man, as it coördinates and regulates organs connected with the intake, assimilation, and storing of energy, including the digestive, circulatory, and secretory systems, sex organs, and those regulating growth, together with the supervision of metabolism for emergencies, and the enormously important postural tonus of the muscles." [1]

The three divisions of the autonomic system may be said to correspond in a rough and major manner to the three great functional interests of food or the means of organic sustentation, fighting and sex. Woodworth says, "The upper division (vagus), from the medulla, favors digestion by promoting the flow of gastric juice and the churning movements of the stomach; and at the same time it seems to favor the comfortable, rather lazy state that is appropriate for digestion. The middle division (sympathetic). . . . checks digestion, hastens the heart beat, and stimulates the adrenal glands to rapid secretion, thus giving rise to the organic condition of anger. The lower division (sacral) has to do with the bladder, rectum and sex organs, and is active during sex excitement." [2]

---

penditure of energy and production of body heat; the tear glands and muscles of the iris. These immensely complicated systems are all woven into one functional apparatus by the autonomic nervous system and it includes all the vital organs except that part of the cerebro-spinal nervous system which coördinates the projicient functions of the organism. The autonomic nervous system may be said to be composed of (1) a double series of ganglia lying along the spinal column and near the viscera, which they innervate, and ganglia in some of the viscera, and also of (2) a series of autonomic centers that lie within the cerebro-spinal nervous system proper. Through this latter group of centers the autonomic and cerebro-spinal systems effect a regulatory control of one another."

[1] *Op. cit.*, 47.

[2] R. S. Woodworth, *Psychology*, 124–5.

Because of its early origin [1] and its simple and highly standardized or fixed functions in promoting and conserving the vital processes, more definitely inherited processes or connections are found in this autonomic system than in the remainder of the nervous organization. This is the true and original home of the reflexes, instincts and tropisms. The organic conditions of respiration, food taking, excretion, circulation, reproduction were standardized long ago when the organism itself was standardized. Neither the organism itself nor the environment which conditions these processes within the organism changes rapidly enough to require any highly alert intelligent control over them. The result is that most of them are highly automatic. It is here that we find the best examples of the definite stimulus producing the definite response with a minimum of modification and a minimum of consciousness. Such reflexes and instincts as the winking of the eye, dilation of the pupils of the eye, stimulation of the heart, dilation or closing of sweat glands and the secretion of the major glands and ductless glands of the body, the processes of swallowing, digestion, breathing, excreting, etc., are examples of the inherited functioning of this system. It ordinarily requires, or permits, relatively little interference from the central nervous system where intelligence resides. But such interference is upon occasion consummated, perhaps more often indirectly than directly.[2] The direct interference of the central with the autonomic nervous system appears to take place when the organism as a whole is in danger from without or when it requires all of its energies immediately for protection, or in some other crisis. In such cases the startled warning from without may cause digestion or other vital but temporarily unnecessary functions to be suspended; or it may quicken the response of the heart for a supreme effort of strength. Thus, on the whole, the vegetative or autonomic

[1] Kempf, *op. cit.*, 16.

[2] Woodworth, *op. cit.*, 125.

nervous system, perhaps best typified by the sympathetic system, may be regarded as an exchange or communicating system quite as much or more than as an organizing or control system. Certainly its control is characteristically automatic and does not directly involve the higher or conscious directive centers of the brain. The function of highly directive or conscious control belongs primarily to the central nervous system.[1]

However, the control functions of the autonomic nervous system are by no means unimportant. The autonomic is merely secondary in this respect to the central nervous system and its methods are more direct and less conscious. Paton says, in this connection, "This vast apparatus or autonomic system is a silent participant in the regulation and control of organized activities; but although silent it possesses extraordinary importance in providing means of adaptation, sometimes described as 'unessential,' but which as a matter of fact are intimately connected with another apparatus of vital significance to the organism. The nervous supply distributed from this vegetative system to the various organs, such as the heart, lungs, thyroid, adrenals, etc., indicates the close relation of its functional control over the organs that have an enormous capacity for modifying the workings of the central nervous system, and even of interfering with life itself. This autonomic system regulates the affective life, and in this way determines character, temperament, and indirectly promotes or inhibits the higher intellectual function. Kempf has reminded us that the physiological divisions of the body, regulating the assimilation, conservation, distribution, and expenditure of energy and the elimination of waste products, act as one autonomic system." [2]

[1] Herrick, *op. cit.*, 121, 328; Paton, *op. cit.*, 53.

[2] *Op. cit.*, 52–53. See also Herrick, *op. cit.*, 82. However, Kempf (*op. cit.*) has insisted that the central nervous system and its extensions, even man's cultural organization, have grown up under the control and instigation of the autonomic system to serve its ends. He says, "In the biological forms previous to the evolution of a projicient sensori-motor system the autonomic apparatus

It is not until the amphibians appear that those structural changes in the nervous system begin which later become the brain,[1] and the cerebral cortex probably first appeared in ani-

was submerged in an environmental medium which brought to it the supplies necessary for metabolism. This hazardous dependence of living tissue upon the fates of nature has been gradually reduced as a compensatory working system has been evolved about the autonomic apparatus. This apparatus virtually submerged itself within its own tissues and built up a complicated medium through which it might project itself to master the environment. Man has made another step forward in this same direction of assuring his autonomic comfort by constructing with machinery a protective environment within the larger environment. Civilization is the result of the incessant striving of the autonomic apparatus to extend and refine this sphere of influence. In the behavior of all the vertebrates we see constantly the tendency of the autonomic system to develop, or to sacrifice if necessary, the projicient sensori-motor system in order to save itself (p. 12). . . . Very early in the embryonic development of the human organism, before striped muscle cells and cartilage or bone-forming tissue appear, a circulatory system is started (for distribution of food—the first circulation developed being associated with the yolk-sac), and soon after the heart an autonomic (vagus) nerve cell or center appears. As the spinal cord evolves, the peripheral ganglion colonies emigrate from the spinal cord segments. The autonomic centers within the cord and, particularly in the medulla, are far enough developed to support the inference that, like the development of the cerebrum on the distance receptors, the cerebro-spinal system is developed upon a nucleus of the central autonomic sensori-motor system. It would be expected that the final construction of the two systems would proceed together and regulate one another. The point to be emphasized is the priority of the autonomic apparatus over the projicient apparatus. The unstriped muscle cell appears before the striped muscle cell" (p. 16). This view would seem to imply that in the last analysis the autonomic system controls all action, indirectly if not directly. But the fact is that the brain, whether or not it was originally the product of the needs of the autonomic system, has, at least in its later stages of human development, come under the dominance of the psycho-social environment which man has created and which we call civilization (see Chapters V and VI below), and it is this accumulated environment which molds man and which uses the higher central nervous system as its chief agent in the molding process. Through this environmental control the autonomic system is itself reduced to a subordinate position instead of its former position of dominance over the organism. In this way convention, and latterly science, contends with and largely masters instinct. While the more stable, or the vegetative and reproductive, activity mechanisms are left in the main to the direction of the autonomic system and are interfered with by the conscious processes only upon evident necessity, the more experimental and progressive adjustment mechanisms are organized under the direction of the newer cerebral conscious system, for only thus can the requisite flexibility of adjustment of the organism to its environment be secured.

[1] Paton, *op. cit.*, 62.

mals of the Triassic or Carboniferous periods of geologic development.[1] "The more primitive types of intellectual activity are useful merely for adaptations occurring within a very limited range, and practically little provision is made for the collection and recollection of experiences which are useful in the conservation of energy or life.[2] . . . All animals, below the reptiles, are practically entirely devoid of those special cortical mechanisms which greatly increase the capacity for combining and elaborating impulses and impressions transmitted by the sensory tracts to the brain." [3] As a result the reactions of these lower animals are primarily instinctive. The higher in the process of animal evolution we ascend the greater the extent to which the more complicated activities are centered under the dominance and control of the cerebral cortex.[4] The purpose of this organ is to give individual and social experience a chance to operate in making adaptations of the organism to the immediate environment by means of intelligent inhibition and modification of previous tendencies.[5]

The brain, and especially the cerebral cortex, therefore appeared for the purpose of integrating, organizing and controlling the functioning of the organism in an increasingly complex and a rapidly changing environment more perfectly than had been possible with the autonomic and the rudimentary central nervous systems alone. Just as there comes a time in animal evolution when, with increasing complexity of the organization of the body, "protoplasmic activities on the lower physiological level are no longer adequate to effect the integration and coördination of the more diversified functions to be performed in these complex organs" and the autonomous or peripheral nervous system is brought in to function in organization and control locally, so the complex organism finally has so many functions and adjustments thrust upon it that a cen-

[1] *Ibid.* [2] *Ibid.*, 62–3. [3] *Ibid.*, 66.
[4] *Ibid.*, 79. See also 68–9. [5] *Ibid.*, 83.

tral nervous system arises to make possible further correlation and control.[1] Out of the beginnings of this central nervous system arose a central group of ganglia which became the brain. This brain system continued to develop in size and in adaptation to its functions until it apparently ceased further organic or hereditary development about 25,000 years ago, or less, among the Cro-Magnon men.

One of the chief organs of control functioning in connection with the evolving brain has been associative memory, which enabled the animal to make available past experience through consciousness and unconscious habit adjustments, in addition to the slow method of the accumulation of inherited mutations or variations.[2]

The growing participation of the mental in addition to the purely biological in the function of controlling the organism may be illustrated by recalling some of the steps by which the higher control functions evolved. The cerebral cortex is the organ last to appear in the brain and it is here that the final correlations which figure in consciousness take place. The lower parts of the brain, especially the cerebellum and the thalamus serve largely as correlation centers for connecting the thinking section of the brain with sensory and motor organs.[3] The cerebellum especially "is the great clearing house" for all "afferent systems which are concerned in the proprioceptive functions, so far as these are unconsciously performed."[4] On the other hand, "the thalamus is in the human brain chiefly a sort of vestibule through which the systems of somatic sensory nervous impulses reach the cerebral cortex."[5] Correlative evidence is to be had from the order of develop-

[1] Herrick, *op. cit.*, 252. See also 122, 187.

[2] Herrick, *op. cit.* 32, 328, 346; J. Loeb, *Comparative Physiology of the Brain and Comparative Psychology*, 12–14, and chs. 15 and 16.

[3] Herrick, *op. cit.*, 172 ff., Paton, *op. cit.*, ch. 3.

[4] Herrick, *op. cit.*, 200, 204.

[5] *Ibid.*, 179. See also pp. 132, 134.

ment and the location of the sense organs. Besides containing "all of the most important higher correlation centers of the brain," the cerebrum also contains the sensory centers of sight and hearing.[1] These senses are the most highly evolved which are possessed by man. It is through them that he receives the vast bulk of those sensory impressions which he organizes into ideas, principles and laws. It is, therefore, through this avenue that the chief intellectual content comes.[2]

Herrick further explains the dominating function of the cerebrum, especially in connection with the cerebellum, as follows: "The correlation centers of the brain stem, and particularly those of the cerebral cortex, analyze the afferent impulses entering the brain and determine what particular reactions are appropriate in each situation. After the character of the movement has been determined in this way, the proprioceptive systems coöperate in its execution, and the cerebellum is the central coördination station for the proprioceptive reactions. None of its activities come into consciousness." [3] While the cerebellum appears much earlier, phylogenetically, than the cerebrum and "its functions are wholly reflex and unconscious and are concerned chiefly with motor coördination, equilibration, and, in general, the orientation of the body and its members in space . . . the cerebral cortex, on the other hand, is the organ of the highest and most plastic correlations, which are in large measure individually acquired." [4] Herrick adds elsewhere that "the cerebral cortex differs from the reflex centers of the brain

[1] *Ibid.*, 175, 197.

[2] For further correlative evidence on points emphasized in this paragraph see W. M. Feldman, *The Principles of Post-Natal and Ante-Natal Child Physiology Pure and Applied*, 216–18, 222-3, 228–30, 235, 239, 558, 604, 619–20, etc.

[3] Herrick, *op. cit.*, 204.

[4] *Ibid.*, 123–4. See also 134 and 204. Herrick adds in another place, "The cerebellum, therefore, is intimately connected with all sensory centers which are concerned in the adjustment of the body in space and motor control in general." P. 204.

stem chiefly in that all of its parts are interconnected by inconceivably complex systems of associational connections, many of which are probably acquired late in life under the influence of individual experience, and any combination of which may, under appropriate conditions of external excitation and internal physiological state, become involved in any cerebral process whatever." [1]

The obvious meaning of these two passages is that this cortical control system which dominates the activities of the higher organisms is primarily a habit or acquired system. The cortex was the last step evolved in the struggle for flexibility in neural control. It not being possible to secure the requisite flexibility through multiplying and fusing reflexes, the sensitivity of protoplasm eventuated into constructive intelligence enabling the cerebral cortex to exercise its control largely through thought. The advantages of such a type of control are obvious. A much wider range of stimuli can operate upon the control system, because the stimuli can be apprehended through the perceptual mechanisms and can be assembled from afar. Also, types of stimuli which would not register, or would be but slightly appreciated, under the dominance of unconscious controls, may acquire very great momentum and power under a conscious control system, because of the extreme delicacy of the recording conscious mechanisms and of their power to amplify the stimuli. These same stimuli can be stored, either in memory or in places of objective record, and thus remain operative over a very long period of time.

But how is this transference from an inherited or instinctive control system over to an acquired one accomplished? Of course the control processes of even the autonomic nervous system are not wholly instinctive or inherited. Jennings

[1] *Ibid.*, 325.

tells us that the lowest forms of life show power of varying their reactions on the analogy of experience.[1] It is the nature of protoplasm to be sensitive to impressions and to carry some record of that impression for future use.[2] Even among plants and animals too low in the developmental scale to possess a nervous system responses occur "which appear to be dependent upon certain elementary forms of discriminative irritability or sensitivity."[3] Later, a crude mechanism of adjustment or nervous system appears and this is in time organized into the autonomic system. Here variant adjustments multiply by the aid of the impressionability of protoplasm, nervous and otherwise. But there is no evidence that consciousness, at least perceptual consciousness, is present as an aid to making habit modifications. It is only when the cerebral cortex appears in fairly well developed form that a sufficiently highly developed form of consciousness appears to entitle the control system to be called volitional. The variant element in control has, at this point among human beings, reached such a high degree of development that the organization is not necessarily determined from within the organism at all, but is so logically determined from external and internal considerations that we call it intelligent determination and apply to the causal process the term willed.

This explanation of the high degree of development of the variant or volitional element need not imply an explanation in terms of fiat or magic, or a theological or metaphysical account, at all. Herrick explains the whole thing in terms of conflict. He says that conflict is inherent in the cosmic process, or at least in the biological part of it, from beginning to end. This struggle is not alone between individuals or types, but it is also "between stereotyped innate tendencies or instincts and individually acquired experience," in which the latter has the advantage in so far as the environment is

[1] *Op. cit.*, esp. ch. 13. [2] Paton, *op. cit.*, 34 ff. [3] *Ibid.*, 106.

complex and requires rapid and multiform adaptation. This conflict between instinct and habit occurs even among the protozoa. "And out of this inner conflict or dilemma intelligence was born. With the gradual emergence of self-consciousness in this process arises the eternal struggle with self. . . . Conflict, then, lies at the basis of all evolution, and the factors of social and even of moral evolution can be traced downward throughout the cosmic process. The social and ethical standards, therefore, have not arisen in opposition to the evolutionary process as seen in the brute creation, but within that process." [1] As Herrick suggests, the guiding intelligence, the so-called volitional element, in cortical control of the organism is not something imposed from without. It is rather something which grows up from within the life process itself; it is ultimately and finally dependent upon the original irritability or impressionability of protoplasm; its evolution from the primitive beginnings of crude protoplasmic irritability as viewed in the protozoa to the high degree of complexity which we call genius in the modern great leader or thinker is immense in range, but unbroken in process.

The process by which this greater flexibility of movement and adjustment is brought about is partly muscular, partly glandular, and by means of the grosser tissues and organic structures generally; but very slightly so. The flexibility arises primarily because of the fact of the existence of unconnected synapses in large numbers in the human cerebral cortex. Of the approximately nine billion cortical nerve-cells a very large number are not completed at birth but develop and make their connections later.[2] Even after their main connections are made they are capable of some variability, for the dendritic processes appear to have a very wide range of possibilities in varying their connections. It is said that as many as sixty dendritic processes have been observed

[1] Herrick, *op. cit.*, 349.

[2] *Ibid.*, 111.

attached to a single neurone, each process possibly representing a potential connection. It is also known that these dendrites relax and renew their contacts according as they are affected by fatigue or some other stimulus or condition.[1] It is supposed that at no time in the life of the organism are all of the neurones fully developed. Consequently the capacity for making new associations is never exhausted in any one. When it is reflected that consciousness accompanies these neural processes, it is easy to perceive how unlimited are the chances for multiplying ideas and willed or affectively supported plans and patterns.

One further problem from our point of view yet remains for consideration in this connection. What controls this conscious or thinking adjustment process? Is it the environment, including the psycho-social environment of custom and tradition, of institutions, of science even? Or is it the underlying instincts and reflexes upon which the conscious controls are built as variants? The answer to this question has profound significance for a theory of education or of social control. The instinctivists, fairly represented by McDougall,[2] maintain that the acquired elements in character or control are formed under the dominance of the instincts. The environmentalists maintain the opposite and look to the environment, especially to the psycho-social environment, for the formative factors back of the control organization. It is true that the central nervous system does not, at least in the lower stages of development, initiate orderly activity but that it comes into existence merely to control or direct it.[3]

But it is not necessary for it to initiate it; it does quite enough if it directs it. Paton's statement that "as far as we

[1] *Ibid.*, 44; also Woodworth, *op. cit.*, 34 ff.; E. L. Thorndike, *The Original Nature of Man*, ch. XIV.

[2] *Introduction to Social Psychology* (8th ed.), esp. p. 176.

[3] Paton, *op. cit.*, 41; Kempf, *op. cit.*, 12–16.

are able to judge, it is the drive from the lower levels that decides upon the selection of paths in the higher planes," [1] does not carry conviction. No doubt such lower drives do modify or help to form the organization of the higher or conscious controls, and some habits are shaped by instincts,[2] but nothing seems clearer to unprejudiced observation and experience than the fact that instincts are constantly being modified or repressed or supplanted by habit organizations. It matters little if the instinct is in a measure taken care of by the control organization, either through sublimation or incorporation, so long as the social organization and not the instinct or lower nervous organization determines the plan of disposition. People must eat or perish and the desire for sex activity and companionship is sometimes and in some individuals very strong. No social system can disregard them entirely, but no rational control system will disregard them any more than it will be dominated by them. In so far as they conflict with other valued interests in society a compromise is necessary, not complete surrender; and, according to Herrick, it is out of this sort of conflict that intelligence and rational and ethical and social control arose. The conscious, willed control system centering in the cortex came into existence to prevent disastrous domination and to provide for intelligent adjustments. As Woodworth rightly says, the acquired elements in character are far more numerous than the inherited ones,[3] and collectively, if not always individually, they are also much stronger.

Both Herrick and Paton really testify to the truth of this contention in their statements. Paton says, "We have already remarked upon two of the functions of man's new brain, namely, to act as a transformer of the impulses streaming up from the old brain, and to hold these in check long enough to insure proper arrangement for the distribution of energy

[1] *Ibid.*, 165. See also pp. 193, 338. [2] *Ibid.*, 279. [3] *Op. cit.*, 296.

without throwing too much energy into one channel. As the brain and nervous system developed, the centers for the older primitive protopathic sensory apparatus and stereotyped instinctive activities which were located in the basal ganglia, were covered over and reinforced by the complicated new brain or cerebral cortex. The addition of these areas with their so-called higher functions greatly extended the range of adaptation by utilizing consciousness. Under the old régime adaptation unattended by any sense of the perspective of events was sufficient to satisfy actual conditions, but with the extraordinary increased complexity of the integrations made possible by consciousness and the intricate epicritic system an entirely new set of functions was called into action. In man there still exists the old apparatus by which primitive instincts found expression, but with the growth of the neopallium, the new brain, *the coördination of conduct and the domination of instinct by intelligence were insured.*"[1] The only question which remains is as to whether intelligence was created by instinct to serve its ends or by the increased pressures of the environment, to save the organism as then constituted from destruction. The growth of intelligence is itself conditioned on the increased recognition and appreciation of the environment.[2] In the individual development, as well as in that of the race, where the environment ceases to make demands or has never developed to the point of making demands upon the intelligence, the mental functions deteriorate or fail to develop and leave the control of the organism to the unrestrained exercise of the instincts. The meaning of culture is that man comes to live largely on an intellectual contact basis rather than on an instinctive one. While the intellectual functions are not necessarily or exclusively opposed to the instinctive functions, it may be said that intelligence arose in the service of the individual organism and under the domi-

[1] *Op. cit.*, 335. (Italics mine.)

[2] *Ibid.*, 126.

nance of the environment—especially the psycho-social environment—more for the purpose of directing or controlling the instincts than for serving them.

Herrick, after speaking of the relation of the cerebral cortex to the highly elaborated subcortical organic circuits, which it assembles, integrates and dominates, says, "The functions of the cerebral cortex fall into two great groups: (1) Correlations of great complexity, *i. e.*, with many diverse factors. This is of no practical value without capacity for choice between many possible different reactions to the situation. This 'switch-board' type of function is simply a higher elaboration of the physiological patterns of the lower correlation centers. (2) Retentiveness of past individual impressions in such form as to permit of subsequent recall and incorporation into new stimulus complexes. This mnemonic function is simply a higher elaboration of primitive protoplasmic 'organic memory' or individual modifiability. The mechanism of the first group of functions may be largely innate and heritable; that of the second is necessarily individually acquired. These two functions lie at the basis of all *mind*." [1] This acquired element, the more original or directive factor in mind, is the result of the impact of the environment.

The pertinent conclusion to the argument of this chapter is that the organism, beginning its phylogenetic existence largely as an inherited structure and organization, has gradually evolved, through the aid of the quality of impressionability inherent in protoplasm, into a highly complex and highly modifiable type. In the higher animals this modifiability is in some degree subject to intelligence, and in man it becomes, in some cases at least, and with respect to some things, rational. Although this consciousness, which is basic to intelligent direction of the organism, arose originally out of the organic neural systems and processes, it has come in the course of

[1] *Op. cit.*, 346.

time to be detached in large measure from its origin, and has fallen predominantly under the direction of the massive and persistent psycho-social environment with its large accumulation of valuations and interests, institutional and otherwise. This psycho-social environment, which has come latterly to control the conscious or directive organization of the higher brain centers, has thereby largely displaced the autonomic and instinctive organization in the control of this same higher brain organization. The psycho-social environment, which probably arose originally as a stabilizer and as an aid to the carrying out of vegetative and reproductive ends, has become in large measure master of the whole organism and shapes its ends subject only to the limitations of inheritance. Thus instinct comes in its manifestations largely to be subjected to environmental control.

CHAPTER IV

THE NATURE OF INSTINCT—ANALYSIS AND CRITICISM

The discussion in the previous chapter made it clear that action is conditioned by two general types of factors,—those that exist within the individual and those that constitute his surroundings or environment. The environment is a result of the numerous physical, chemical, biological, psychic and social factors working in close or remote connection over long periods of time. These factors are not inherited. Indeed no one man or animal has more than an infinitesimal part in producing them. The internal factors are both inherited and acquired. Of the acquired ones we need not speak here. The inherited factors fall into a number of classes, such as muscular, glandular, osseous, neural, fluid, and they may be classified generally as either organs or organizations. While both of these types of factors influence the activity processes, we are in this study more concerned with the organization aspect, because it is here, on the side of heredity, that we find the instincts, just as in organization also we find the habits among man's acquired equipment. In this chapter we are concerned with the instincts. We do not disregard the organs, nor do we minimize the importance of the inherited organization of structures other than neural. They influence the conduct of man to a much greater degree than has yet been recognized outside of the field of physiology, and one of the phases of sociological study of the future will be to measure and generalize the influence upon social organization and achievement of such physiological and anatomical factors as stature, glands,

senescence, longevity, etc. Some reference will be made upon occasion to the influence of some of these factors in these chapters.

But since the most significant activity processes, so far as their connection with the external world is concerned, are transmitted through the nervous system, and since instincts are neuro-muscular or neuro-glandular reaction patterns, the instincts are for us of primary importance among the inherited conditions of action. The meaning of instinct is by no means perfectly clear. Yerkes says, "Instinct is one of those historical concepts which has been overgrown by meaning. It is so incrusted with traditional significance that it is almost impossible to use it for the exact descriptive purposes of science." [1] One finds in the literature the most contradictory statements, not only with respect to what other writers have said, but also with reference to contentions of these authors themselves elsewhere stated in their works. Some of the psychologists do not attempt a definite and concise definition of instinct, probably having this confusion and uncertainty in mind. This is particularly true of Knight Dunlap,[2] James Ward,[3] Max F. Meyer,[4] and Titchener in his *Text Book of Psychology*.[5] But underlying all this mixture and confusion certain general tendencies in the conception and definition of instinct are discernible; and these are generally correct, as viewed in the light of modern scientific developments. It is the purpose of this chapter to examine these statements and to attempt to arrive at a fairly clear and trustworthy statement of the more scientific and dependable tendencies.

[1] R. M. Yerkes, *Introduction to Psychology*, 378.
[2] *System of Psychology.*
[3] *Psychological Principles.*
[4] *The Psychology of the Other One.*
[5] Titchener does not define instinct in his older work entitled *An Outline of Psychology* (1896). See *Text Book of Psychology*, 462 ff.

Almost all of the psychologists regard instinct as inherited. Even Stout, who distinguishes between the psychological and the biological meanings of instinct, emphasizes this point.[1] The Scotch psychologists and philosophers generally, and the English writers, perhaps to a less degree, make this distinction between the biological and the psychological aspects.[2] Stout includes his discussion of instinct under the general division of perception, showing his inclination to connect it up with consciousness. His definition of instinct from the biological standpoint is as follows: "Instinct . . . distinctively consists in a special pre-adaptation of the nervous system congenitally determined so as to give rise to special bodily actions in response to appropriate stimuli." [3] This view of instinct he, of course, rejects as too mechanical for psychological purposes. It does not distinguish it sufficiently from the reflexes.[4] He declares, "Instinctive conduct does and reflex action does not presuppose the coöperation of intelligent consciousness, including under this head interest, attention, variation of behavior according as its results are satisfactory or unsatisfactory, and the power of learning by experience." [5] This definition represents his psychological view of instinct. It is based on the assumption that mind is essentially different and disconnected from behavior. These supposed conscious and variable attributes of instinct, psychologically defined, really indicate the break-up or modification of instinct under the pressure of the environment. Stout is able to distinguish instinct psychologically considered from instinct biologically considered because in the former case he is dealing not with pure instinct at all, but with an environmental corruption of instinct which brings

[1] G. F. Stout, *Manual of Psychology*, 334.
[2] For an example of the Scotch treatment see J. Drever, *Instinct in Man*, 18.
[3] *Op. cit.*, 340.
[4] *Ibid.*, 343.
[5] *Ibid.*

the changing adjustment into consciousness. This so-called psychological viewpoint is really a survival of the highly intellectualistic or sophisticated interpretation of human action so common in the late eighteenth and early nineteenth centuries, and nowhere else so common as among the Scotch metaphysicians. British psychology has not yet recovered from this over-intellectualization. The leavening influence of social psychology, psychoanalysis, the new physiology, animal psychology and behaviorism has not yet had its effect in these quarters. The new psychology, experimentally based, can find no such distinction as Stout emphasizes.

Pillsbury presents three definitions of instinct, representing as many distinct viewpoints. His first definition considers instinct as an inherited response.[1] This view, he says, regards instinct simply as "a more complicated reflex, or one that in its variability in some degree approaches the voluntary act." [2] He further elaborates this viewpoint regarding the nature of instincts in these words: "They are more complicated than the reflex, involve a greater number of muscles, and a larger number of movements in a series. The line between instincts and reflexes, when instinct is used in this sense, is difficult to draw." [3]

The second concept of instinct cited by Pillsbury involves a much broader use of the term. Here it is defined in terms of the end instead of the process, that is, it is conceived teleologically or anthropomorphically instead of structurally. It is viewed from the standpoint of its function in adjustment instead of from the standpoint of its mechanism. Such a definition of instinct covers a wide range of acts in man. Instinctive acts, so considered, "show considerable variation and reach the final end by various ways." [4] He cites hunting as

[1] W. B. Pillsbury, *The Fundamentals of Psychology*, 422.
[2] *Ibid.*, 421.
[3] *Ibid.*
[4] *Ibid.*, 422.

an example. Here the anthropomorphically assumed purpose is always the same, but the technique varies according to the environmental difficulties to be overcome or the difficulty experienced in capturing the particular type of animal desired. One might properly raise the question as to whether this assumption of the identity of end in hunting is correct. As a matter of fact there may be as many purposes in hunting as there are types of objects to hunt or types of hunters and their needs, or combinations of these, to say nothing of the circumstances under which men and other animals hunt. Also, it will readily be seen that this view of instinct does not differ widely from Stout's psychological definition, while the preceding definition elaborated by Pillsbury corresponds pretty closely to Stout's biological definition of instinct.

Pillsbury's third definition conceives of instinct as still less definite, or still more "psychological." He says, "In the extreme instances of this class little is determined by inheritance other than that the desired end shall be attained. The attainment may be by any method that previous experience or the acquired habits shall dictate. Here belong very many, if not most, of the complicated instincts manifested by the human adult. Acquisitiveness, combativeness, sympathy, and the great mass of instincts that may be regarded as protecting the human individual, the family, and the social group are constituted of movements that have no regularity, but nevertheless drive the individual to a fairly definitely prescribed end." [1] This "fairly definitely prescribed end," as here stated, is obviously either a metaphysical or a theological, that is, an anthropomorphic assumption, for the writer goes on to say that the reason for the dominance of the end is not usually appreciated.[2] The end can exist only in the mind of God (theological), or in the nature of things (metaphysical), or in the highly sophisticated and teleological

[1] *Ibid.*, 423–4. [2] *Ibid.*, 424.

interpretative logic of the onlooker. It is a superimposed value, existing in the human mind of the philosopher; it is not a part of the instinctive mechanism, so long as this mechanism remains an instinct. Hence, it is not instinctive.

Most of the psychologists and neurologists appear to support the mechanistic interpretation of instinct as set forth in the first definition of Pillsbury and the biological account of Stout. Exceptions will be noted later. Loeb, indeed, makes instincts identical with tropisms or tropistic reactions.[1] He rejects the old conception of instincts, "that they are inherited reflexes so purposeful and so complicated in character that nothing short of intelligence and experience could have produced them." [2] He denies that they are determined or directed in the central nervous system or upper brain, as some writers would seem to imply. He says, "It is only certain that neither experience nor volition plays any part in these processes." [3] In explaining the assumed tropistic character of the instincts he says, "The explanation of them (the tropisms) depends first upon the specific irritability of certain elements of the body surface, and, second, upon the relations of symmetry of the body. . . . For the inheritance of instincts it is only necessary that the egg contain certain substances—which will determine the different tropisms—and the conditions for producing bilateral symmetry of the embryo." [4] This implied definition of instinct makes the automaticity of the stimulus-response process of primary importance in the instinct. It is a structural conception of instinct. If consciousness of purpose or end enters in, except as a supplementary aid or after effect, it is because the instinctive or inherited process failed of and by itself to secure

[1] J. Loeb, *Forced Movements, Tropisms, and Animal Conduct*, 156.
[2] See *Comparative Physiology of the Brain and Comparative Psychology*, 6.
[3] *Ibid.*, 187.
[4] *Ibid.*, 7.

an acceptable or wholly successful adjustment and the instinct therefore has to be modified. If consciousness follows the act it is because the adjustment already secured has not continued to take care of the situation and of the needs of the adjusting organism.

The oldest traditions of the newer psychologists in this country, at least by word of pen, conform to this strict inheritance view of instinct. William James says, "Instinct is usually defined as the faculty of acting in such a way as to produce certain ends, without foresight of the ends, and without previous education in the performance." [1] This definition is, to be sure, anthropomorphically stated and does not definitely exclude consciousness of process and of end, but it does imply that the instinct is a matter of heredity. Thorndike, who in large measure carried on the tradition of James, also speaks of the instinct as an unlearned tendency.[2] Indeed, Thorndike's three types of unlearned tendencies of man correspond rather closely to Pillsbury's three types of instincts, except, possibly Pillsbury's first type is more complicated than Thorndike's reflex and Thorndike does not find so much variation in his second type (instinct) as does Pillsbury. Certainly Thorndike does not define instinct in terms of the end value, but in terms of the mechanism. It is in terms of the mechanism that he characterizes all these types of unlearned tendencies, unless we interpret the word "tendencies" itself to indicate a telelogical concept. Of the reflex he says, "When the tendency concerns a very definite and uniform response to a very simple sensory situation, and when the connection between the situation and the response is very hard to modify and is also very strong so that it is almost inevitable, the connection or response to which it leads is called a reflex." [3] It is interesting to note that practically

[1] *Psychology*, II, 383. [2] E. L. Thorndike, *The Original Nature of Man*, 5.
[3] *Ibid.*

all the psychologists and neurologists would agree on this definition of the reflex. This is not wholly true, however, for some of the behaviorists look upon the organism as a whole as being self-active, hence for them the reflex is largely an abstraction. Watson says, "The term reflex is a convenient abstraction in both physiology and behavior. . . . We mean by reflex when used in this way that action takes place under appropriate stimulation in some fairly circumscribed glandular or muscular tissue. It is an abstraction because reflex action in the eye, the leg, hand or foot can never take place in isolation. Action is altered in other parts of the body as well. . . . Theoretically we might have a pure reflex if we were to stimulate a single neuro-fibrillar ending of an afferent neurone and had a single neuro-fibrillar strand of a motor neurone connected with a single muscle fiber." [1]

Thorndike defines the instinct by comparison with the reflex: "When the response is more indefinite, the situation more complex, and the connection more modifiable, instinct becomes the customary term." [2] He selects one's misery at being scorned as an instance of this type of unlearned tendency. Of the last type of unlearned tendency which was in these pages compared to Pillsbury's third type of instinct, he says, "When the tendency is to an extremely indefinite response or set of responses to a very complex situation, and when the connection's final degree of strength is commonly due to very large contributions from training, it has seemed more appropriate to replace reflex and instinct by some term like capacity, or tendency, or potentiality." [3] On the whole, the language in which both James and Thorndike describe the mechanism of instinct—its indefiniteness and its variability—would seem, in some degree at least, to contradict their assump-

[1] J. B. Watson, *Psychology from the Standpoint of a Behaviorist*, 233.
[2] *Op. cit.*, 5.
[3] *Ibid.*

tion that it is an unlearned tendency. From the standpoint of structure it can be adaptive only in so far as the structure corresponds to an act to be performed. If the environment has to whip it into shape by means of a habit organization which it superimposes upon it, it is not a thing, a unit process, at all. By calling it a tendency we are describing it in terms of the superimposed habit adaptation instead of in terms of the organization, or lack of organization, determined in the heredity.

The behaviorists conform most closely to the mechanistic or structural definition of instinct. Watson says instinct is "an hereditary pattern reaction, the separate elements of which are movements principally of the striped muscles. It might otherwise be expressed as a combination of explicit congenital responses unfolding serially under appropriate stimulation." [1] Herrick implies essentially the same definition of instinct when, in classifying the three types of action, he makes the following characterization of the first type as "Innate functions of invariable or stereotyped character developed through natural selection or other biological processes, whose mechanism is hereditary and common (with small differences only) to all members of a race or species, typified by reflex action and purely instinctive action." [2] Elsewhere he speaks of this uniformity of reaction in the animal race or species and the hereditary character of the action pattern as the underlying bases of instinct.[3] Woodworth also defines instinct as native behavior.[4] He adds, further, in speaking of the structural aspect of the instinct, "In terms of the nervous system, an instinct is the activity of a team of neurons so organized, and so connected with muscles and sense organs, as to arouse

[1] *Op. cit.*, 231–2. See also *Behavior: An Introduction to Comparative Psychology*, 106.

[2] C. J. Herrick, *An Introduction to Neurology*, 335.

[3] *Ibid.*, 341.

[4] R. S. Woodworth, *Psychology: A Study of Mental Life*, 105, 109.

certain motor reactions in response to certain sensory stimuli." [1]

Judd holds to essentially the same interpretation. He says, "Coördinated activities of the muscles, provided for in the inherited structure of the nervous system, are called instincts." [2] He further says that the instinctive act is in no way due to intelligence, that it appears in the same form in all members of the species, and that the significance or value of the act is not recognized on the first performance.[3] Angell says, "Instincts, like reflex acts, rest upon the presence in the nervous system (both central and autonomic) of native pathways for the discharge of impulses into the muscles. Some of the instincts are perfect at birth.[4] . . . Others appear and come to perfection at later stages of the animal's life. But whenever they appear, they involve innate, inherited forms of conduct and are in no sense learned or acquired like the voluntary forms of action." [5] Colvin and Bagley characterize instincts as "inherited paths of preferred conduction between stimulation and response." [6] They declare that instinctive behavior has the following four attributes: (1) is directed toward some end that is useful, (2) is made up of various simple reflex activities, (3) is not subject to voluntary direction, and (4) is wholly inherited and not learned.[7]

The psychologists are divided in their opinion as to the relationship between instincts and reflexes. Those of one large group maintain that instincts are merely complex organizations of reflexes. Thus Warren says, "The term instinct will

[1] *Ibid.*, 107.
[2] C. H. Judd, *Psychology: A General Introduction*, 213.
[3] *Ibid.*, 214.
[4] He cites sucking as an example.
[5] J. R. Angell, *Introduction to Psychology*, 215.
[6] S. S. Colvin and W. C. Bagley, *Human Behavior*, 127.
[7] *Ibid.*, 128.

be used here . . . to denote those complications of behavior which involve a series of reflex activities, where (a) one reflex furnishes the stimulus that leads to the next, and (b) the connections depend upon inherited structure, not upon individual modifications." [1] James says that instinctive acts conform to the general reflex type.[2] Watson says specifically of the constitution of an instinct, "Each element in the combination may be looked upon as a reflex. An instinct is thus a series of concatenated reflexes." [3] Thorndike says, "There is, of course, no gap between reflexes and instincts." [4] Hocking, following the biological interpretation, defines instinct as a serial grouping of reflexes.[5] Herrick speaks of instinctive reactions as elaborations of chain reflexes.[6] Loeb states specifically the same view. He says, "It is evident that there is no sharp line of demarcation between reflexes and instincts. We find that authors prefer to speak of reflexes in cases where the reaction of single parts or organs of an animal to external stimuli are concerned; while they speak of instincts where the reaction of the animal as a whole is involved (as is the case in tropisms)." [7]

Titchener finds little distinction, saying that the "instinctive movement itself resembles the reflex in the certainty and promptness of its performance, and in its serviceableness to the organism. It differs from the reflex only in its greater complexity: it is more like a series of reflexes." [8] Yerkes says, "Instinctive acts differ from automatic acts in that they are not quite so stereotyped. . . . They vary more. They differ from will acts in being hereditary in their es-

[1] H. C. Warren, *Human Psychology*, 102.
[2] *Op. cit.*, 384.
[3] *Behavior: An Introduction to Comparative Psychology*, 106.
[4] *Op. cit.*, 5.
[5] W. E. Hocking, *Human Nature and its Remaking*, 38.
[6] *Op. cit.*, 343.
[7] *Comparative Physiology of the Brain and Comparative Psychology*, 7–8.
[8] E. B. Titchener, *An Outline of Psychology*, 250.

sential features instead of individually acquired." [1] Colvin and Bagley characterize instinctive activity as a synthesis of reflex behavior.[2]

Colvin makes a slight distinction between instincts and reflexes, saying that it is rather a matter of degree than of kind.[3] He says that instinctive activities may have a large consciousness correlation, while reflex acts may have none. He adds that this consciousness "is necessary not for the expression of the instinct itself, but for the direction of the various details in the complex process." [4] He also states that it is difficult to say where reflexes leave off and instincts begin.[5] Angell is of the opinion that, "In general, they (instincts) are to be differentiated from reflex acts in part by their complexity, the reflex involving generally a simple muscular response to a single stimulus, and in part by their being ordinarily conscious, whereas many reflexes are unconscious." However, he finds that the similarities are greater than the dissimilarities and that one merges directly into the other.[6] Ogden says that instincts differ from reflexes in being more complex and less direct, and that the meaning of the instinct is to be found in the end which it serves, that it is not merely an aggregate of reflexes.[7] Ladd and Woodworth admit that reflex and instinct are not easily to be distinguished, although the latter term is not usually applied to the simplest activity processes. Instincts are probably attended by much consciousness and even desire, while reflexes are not. However, it is nowhere possible to draw a sharp line of distinction, either in terms of attendant consciousness or complexity, "and instinct and reflex may best be regarded as synonymous terms, definable as innate reac-

[1] *Op. cit.*, 378.
[2] *Op. cit.*, 127.
[3] S. S. Colvin, *The Learning Process*, 34.
[4] *Ibid.*
[5] *Ibid.*, 35.
[6] *Op. cit.*, 215; also *Psychology*, 339.
[7] R. M. Ogden, *An Introduction to General Psychology*, 163.

tions to stimuli." [1] Holmes holds that, "while instinct is most intimately related in its nature and origin to reflex action it would be an error to regard it as consisting of nothing but direct responses to external stimuli." [2] He emphasizes both the internal preparedness and the consciousness aspects of instincts in addition.[3]

Perhaps Woodworth makes as explicit an examination of the distinctions as any writer who does not insist upon a clear-cut separation between the biological and the psychological viewpoints. He says, "There is some difference between the typical reflex and the typical instinct, though it is not very obvious what the difference is." [4] He groups the distinctions under three categories: "The typical reflex is a much simpler act than the typical instinct, but it is impossible to separate the two classes on this basis. At best it would be a difference of degree and not of kind. . . . Another distinction has been attempted on the basis of consciousness. Typically, it may be said, a reflex works automatically and unconsciously, while an instinct is consciously impulsive. The reflex, accordingly, would be an unconscious reaction, the instinct a conscious reaction. But this distinction also breaks down on examination of cases. . . . These cases point the way, however, to what is probably the best distinction. It was when the flexion reflex was *delayed* that it began to look like an instinct, and it was because sneezing was a *slow* response that it had something of the character of an instinct. Typically, a reflex is a prompt reaction. It occurs at once, on the occurrence of its stimulus, and is done with. What is characteristic of the instinct, on the contrary, is the persisting tendency, set up by a given stimulus, and directed towards a result which cannot be instantly accomplished." [5]

[1] Ladd and Woodworth, *Elements of Physiological Psychology*, 146.
[2] S. J. Holmes, *The Evolution of Animal Intelligence*, 107.
[3] *Ibid.*, 108, 113.
[4] *Op. cit.*, 107.
[5] *Ibid.*, 107–9.

For the most part we might well be content to allow the different psychologists to answer each other in respect to this controversy over the relationship between reflex and instinct. However, it might be worth while raising a question regarding Woodworth's third distinction. Does not the very quality of the instinct which distinguishes it from the reflex—the delayed character of its execution—transfer it largely from the category of instinct to that of habit? The very process of delaying the activity or adjustment is a process of modifying that adjustment, of overlaying or transforming the inherited element in it with acquired or habit elements. Finally we may cite Thorndike on this question with approval. He says, "Much labor has been spent in trying to make hard and fast distinctions between reflexes and instincts and between instincts and these vaguer predispositions which are here called capacities. It is more useful and more scientific to avoid such distinctions in thought, since in fact there is a continuous gradation." [1] With this view Meyer also agrees, saying, "It is well to make no distinction between reflexes and instinctive activities." [2] It should be remembered, however, that this gradation in definiteness does not inhere in the types of activity considered as purely instinctive or inherited processes, but that the increasing indefiniteness is due to the entrance of larger amounts of acquired content into the organization of the activity processes.

We may now turn to the consideration of certain variant or minority conceptions of instinct. Striking among these is the lapsed intelligence theory of Wundt. He says, "Movements which originally followed upon simple or compound voluntary acts, but which have become wholly or partly mechanized in the course of the individual life or of generic evolution, we

[1] *Op. cit.*, 6.
[2] M. F. Meyer, *The Psychology of the Other One*, 196.

term instinctive actions." [1] He uses the term impulse to denote the simpler purposive movements, while he uses the term "instinct to denote the more complex impulsive actions which presuppose a long course of individual or generic practice. Instinctive action, therefore, stands midway between reflex movement and pure voluntary action.[2] . . . By an instinctive action we understand . . . something purposive, but involuntary, half impulsive and half reflex." [3] Titchener, in his early writing, appeared to follow Wundt's lead. After stating that both the reflex and the instinctive actions are derived from impulsive action, he says that associated "ideas have lapsed from consciousness before movement becomes instinctive, as they have before it becomes reflex." [4] As structurally defined there is little criticism to be made of Titchener's view of the nature of instinct. The main objection is to his theory of the origin of instinct. The accepted view is that it is the product of hereditary selection. Angell criticizes the lapsed intelligence theory of the origin of instinct because, in the first place, it attributes by implication intelligence to the lowest forms of animal life and, secondly, it assumes the inheritance of acquired characters.[5]

The theory of instincts set forth by the endocrinologists is interesting. Speaking of instinctive activity, with special reference to sex activity, Berman describes the general process as follows: "Translated into endocrine terms, what happens may be pictured as a series of chemical events. When the activity of a ductless gland rises above a certain minimum, its hormones in the blood sensitize, as a photographic plate is sensitized, a group of brain cells, to respond to a message from

[1] W. Wundt, *Lectures on Human and Animal Psychology*, 388.
[2] *Ibid.*
[3] *Ibid.*, 395.
[4] *Op. cit.*, 250. Titchener revises this view in *The Essentials of Psychology* (1920), 267–286.
[5] *Introduction to Psychology*, 222. See also Woodworth, *op. cit.*, 113–114.

the outside world, with a definite line of conduct. There is a registration by the brain cells of the presence of the specific stimulus. Then there is communication by them with the endocrine organs. As a result, some of them are moved to further secretion, and others are paralyzed or weakened. In consequence of changes of concentration in the blood of the various internal secretions, tensions, movements and tumescences, as well as relaxations, inhibitions and detumescences, occur throughout the vegetative system—the blood-vessels, the viscera, the nerves and the muscles. Each wires to the brain news of the change in it. In addition, the brain cells themselves are excited or depressed by the new hormones bathing them. In their final fusion, the commingling vegetative sensations constitute the emotion evolved in the functioning of the instinct. To lower the new tensions throughout the vegetative system to the normal range, the instinctive action is carried out. This superficially is regarded as the essence of the instinct. As a matter of fact, it is only the endpoint of the process, the resultant of a drive to restore equilibrium within the organism. . . . The play of an instinct may therefore be analyzed into four processes. They succeed one another as sensation—endocrine stimulation—tension within the vegetative system—conduct to relieve tension. . . . The most interesting factor in the instinct equation is the endocrine, because that is the one that is most purely chemical." [1]

A great many writers insist upon or imply the existence of an element of consciousness in the instinct. The view of Yerkes is interesting in this connection: "In general, it (instinct) has come to mean acts which are not mere automatisms, but which are guided by what the psychologist calls instinct consciousness." [2] Colvin takes much the same view when he says, "An

[1] L. Berman, *The Glands Regulating Personality*, 171–2. See also Bandler, *The Endocrines*, ch. XII.

[2] *Op. cit.*, 378.

instinctive activity may then be defined as a group of reflexes organized toward some definite goal and accompanied in their expression by a conscious correlate of more or less clearness, and attended by an affective tone of greater or less intensity." [1] Stout, of course, insists upon the conscious element in instinct as a part of his psychological definition. He says, "Instinctive activity essentially involves intelligent consciousness. Animals in their instinctive behavior show the capacity of profiting by the lessons of previous experience." [2] Ladd and Woodworth,[3] Pillsbury,[4] Angell,[5] Woodworth [6] and Holmes [7] take the same general view.

It is often difficult to ascertain from the text whether the writer holds that consciousness is a part of the instinct or merely follows its initial expression. Titchener declares that "the true instinctive movement has no conscious condition. But it is clear that when a certain instinctive movement has been a few times performed, every later repetition of it will have definite conscious antecedents. Human instinctive movement, performed in adult life, always has a conscious condition, consisting of the ideas of object, result and movement." [8] Warren states much the same fact, but from a viewpoint much more helpful to the sociologist, when he declares that "the human adult seldom behaves in a purely instinctive manner. His activities are largely modified and controlled by individual experiences; they belong for the most part to the intelligent type. Even the basal instincts are partly suppressed and reduced to conventional forms." [9] This statement places the

[1] *Op. cit.*, 35.
[2] *Op. cit.*, 347.
[3] *Op. cit.*, 146.
[4] *Op. cit.*, 422–4.
[5] *Introduction to Psychology*, 215.
[6] *Op. cit.*, 108.
[7] *Op. cit.*, 113 ff.
[8] *Op. cit.*, 252–3. Compare I. King, *The Development of Religion*, 26.
[9] *Op. cit.*, 104.

more complex and sophisticated activities in the category where they belong—that of habit. The instincts are modified into habits through the pressures of the environment. Or, perhaps, we should not speak of these basic complex activity mechanisms, upon which present habits are built, as instincts, but rather as previously developed habits. As Watson says, man has fewer instincts than the animals, and he has no pattern instincts at all. On the other hand, man excels in habit-forming capacities.[1]

Perhaps the most frequently quoted definition of instinct from the conscious content standpoint is that of McDougall. He says, "We may, then, define an instinct as an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action." [2] Such a definition applies more correctly to higher than to lower animals and makes an unwarranted distinction between purely reflex and automatic inherited activities and those which develop consciousness in their execution. To introduce consciousness as an essential attribute of instinct is, as suggested before, to run the danger of being betrayed into a confusion of instinct with acquired habit. Even a cursory analysis of McDougall's list of instincts will convince the critical student that he has fallen deeply into this error, including many acquired dispositions and attributes under the title of true instincts. While consciousness in connection with an instinctive activity may be merely the result of its complexity, which involves some friction or conflict (hence consciousness) in its physical or overt expression, a high degree of consciousness is almost

[1] *Psychology from the Standpoint of a Behaviorist*, 254.
[2] Wm. McDougall, *Introduction to Social Psychology*, 8th ed., 29.

certain evidence of the modification of the original instinct or instincts into an acquired disposition under the stress of environmental demands.

A review of the definitions of instinct cited above should convince one that the psychologists generally have not faced the question as to what they mean by including the conscious element in instinct. It is impossible to determine from the context whether they conceive of consciousness as functioning as an organic part of the instinct or as a result or product of an instinct attempting to function in the adjustment of the organism to its environment. If they mean the former, they come in conflict with Herrick's account of the origin and function of conscious control referred to in the previous chapter, which separates consciousness from the instinctive processes which are functions of the lower neural organization ascending through the thalamus into the cerebral cortex only for guidance and redirection as habits. If they mean the latter, they neglect the fact that an instinct could thus function in its pure form only once. Consciousness in such a case is the sign of the transformation which takes place in the instinct upon its first attempt to operate, and therefrom we are dealing not with an instinct—an inherited action pattern or mechanism—but with a habit, the essential adaptive elements of which have been made over under the pressure of the immediate environment.

McDougall recognizes such a modification of the original inherited equipment as the common procedure in the development of higher life forms. He says, "While it is doubtful whether the behavior of any animal is wholly determined by instincts quite unmodified by experience, it is clear that all the higher animals learn in various and often considerable degrees to adapt their instinctive actions to peculiar circumstances; and in the long course of the development of each

human mind, immensely greater complications of the instinctive processes are brought about, complications so great that they have obscured until recent years the essential likeness of the instinctive processes in men and animals." [1] While thus admitting that these instinctive action patterns are modified in the adjustment process in all higher animals, thus resulting in new activity patterns or complexes, he continues to speak of these reorganized activity complexes as instincts. He admits, it may be inferred, the building up of an acquired habit adjustment on top of an original instinct, but calls the whole resulting adjustment or superstructure by the name of the underlying inherited foundation process.

In man this complication and even obscuring of the instincts is much greater than it is among the lower animals. Just as the mental life of man is more complex and richer than is theirs, so is his power of acquiring action patterns on the basis of experience greater. McDougall continues, "These complications of instinctive processes are of four principal kinds, which we may distinguish as follows:—(1) The instinctive reactions become capable of being initiated, not only by the perception of objects of the kind which directly excite the innate disposition, the natural or native excitants of the instinct, but also by ideas of such objects, and by perceptions and by ideas of objects of other kinds. (2) The bodily movements in which the instinct finds expression may be modified and complicated to an infinitely great degree. (3) Owing to the complexity of the ideas which can bring the human instincts into play, it frequently happens that several instincts are simultaneously excited, when the several processes blend with various degrees of intimacy. (4) The instinctive tendencies become more or less systematically organized about certain objects or ideas." [2] Here he outlines in an admirable way the process by which the original in-

[1] *Ibid.*, 31. [2] *Ibid.*, 31–32.

stinctive adjustments are broken up and new habit complexes are substituted or added to meet the demands of a new environment which is different from the one in which the original instincts were selected into the organism. These newly formed organizations here described undoubtedly constitute habit or acquired adjustments, since confessedly they do not constitute the original inherited stimulus-response adjustment processes.

A somewhat different conception of instinct, and perhaps one further removed from strictly scientific usage and more closely approaching semi-popular usage, is that set forth by Veblen. This writer loosely defines instinct as a consciously purposive action based on tropisms and reflexes. He says, "As the term is here used, therefore, and indeed as it is currently understood, the instincts are to be defined or described neither in mechanical terms of those anatomical or physiological aptitudes that causally underlie them or that come into action in the functioning of any given instinct, nor in terms of the movements of orientation or taxis involved in the functioning of each. The distinctive feature by the mark of which any given instinct is identified is to be found in the particular character of the purpose to which it drives. 'Instinct,' as contradistinguished from tropismatic action, involves consciousness and adaptation to an end aimed at." [1] He continues, "They (instincts) range in this respect all the way from such reactions as are doubtfully to be distinguished from simple reflex action on the one hand, to such as are doubtfully recognized as instinctive because of the extent to which reflection and deliberation enter into their execution on the other hand." [2] While this definition will be seen to resemble very closely that of McDougall, it is decidedly more vague and elusive and therefore less applicable in close and

[1] T. B. Veblen, *The Instinct of Workmanship*, 4. [2] *Ibid.*, 5.

critical thinking. It is to be noted that it insists even more pointedly upon the conscious and selective element in adjustment and thereby lays open the way to the inclusion of acquired habits under the category of the instincts.

Veblen is at especial pains to distinguish the definitely purposive character of the true instinct from the quasi-purposive nature of the tropism and the reflex. On this point he writes as follows: "Such quasi-tropismatic activities may be rated as purposeful by an observer, in the sense that they are seen to further the life of the individual agent or of the species, while there is no consciousness of purpose on the part of the agent under observation; whereas 'instinct,' in the narrower and special sense to which it seems desirable to restrict the term for present use, denotes the conscious pursuit of an objective end which the instinct in question makes worth while." [1] In reply to this view it might be asserted that a genuine instinct could never be consciously purposive, but only apparently purposive, just as are the simpler tropisms and reflexes; for where consciousness of purpose enters into the act there is *ipso facto* modification from instinct into acquired habit, the consciousness of purpose being the registration of the strain involved in the readjustment from the old instinctive to the new learned activity. This fact of modification Professor Veblen would admit, just as McDougall admits it; and like McDougall he would call the resulting adjustment activity, which is primarily learned, an instinct. An example of such usage is his so-called instinct of workmanship, to the discussion of which his definition here quoted forms an introduction.

The views of these two writers on instinct have been set forth at some length because they are representative of the current thinking in the social sciences. That these views are incorrect and largely uncritical, belonging to the semi-popular rather than to the scientific, critical usage of the term in-

[1] *Ibid.*, 5. Compare McDougall, *op. cit.*, 28.

stinct, must be apparent to one who analyzes the matter carefully. To the above definitions of instinct we may add two others by way of illustrating the growing transition to a more critical usage. Trotter more nearly approaches a scientific formulation of the meaning of the term when he says, "The word 'instinct' is used here to denote inherited modes of reaction to bodily need or external stimulus." [1] Nor is the following distinction drawn between instincts and reflexes wholly incorrect. He says, "Reactions which should be classed under the head of instinct (as distinguished from reflexes) are delayed . . . complex (. . . acts rather than mere movements), and may be accompanied by quite elaborate mental processes." [2] *The New Standard Dictionary* offers a more satisfactory definition of instinct, as follows: "Reactions that are merely reflex or automatic, in the purely physiological meaning of these words, are not properly spoken of as instinctive. Instinct implies at least a low degree of consciousness; but its reactions are not learned or directed by conscious process of reasoning. The following characteristics are, therefore, attributable to every form of instinct:—(1) It is adaptive, or directed toward some end; (2) that end is somehow connected with the welfare of the species or of the individual as a member of the species; (3) the reaction is psycho-physically complex; and (4) it is native or inherited and not learned. No other animal is so full of instincts as man." [3]

There are certain rather patent errors in the two definitions last quoted, as well as corresponding statements cited earlier in this chapter. It is difficult to understand why delayed response should be regarded as characteristic of an instinct. Delay in response indicates, on the contrary, that the instinct is

[1] W. Trotter, *Instincts of the Herd in Peace and War*, 94.

[2] *Ibid.*, 94, 95.

[3] This last statement is in direct contradiction to the views set forth above from Watson and Warren.

not working smoothly and that it is being modified into an acquired habit response. That it is complex may be accepted without question, although, as stated above, it may be doubted if a distinction on the basis of complexity has any appreciable value for an understanding of the nature of instinct. To characterize it as an act rather than a mere movement seems too much like taking refuge in a mere meaningless phrase, unless it is meant thereby to indicate that it is consciously controlled. This distinction between instinct and reflex on the basis of a conscious content is insisted upon in both the definitions last quoted and many of those previously cited. But surely this distinction cannot be applied to the lower animals also, where conscious control is at a minimum, nor indeed in any rigid way to man. A great many human responses, such as breathing, swallowing, perspiring and the response of rapid blood flow to excitement, are unconsciously initiated, yet are highly complex and may be delayed. That the instinct is necessarily directed towards some end, except in the general and anthropomorphic sense that all activity represents some sort of adjustment or adaptation, is not true. "It cannot be said that every instinctive action is purposeful, for instance, the flying of the moth into the flame." [1] If by adaptive or being directed to some end is meant a useful end or even a conscious end, the absurdity of this contention becomes immediately apparent. The assumption that the instinct is in all cases necessarily connected with the welfare of the species or of the individual is also not tenable. Aside from the possibility of the development of purely pathological instincts or inherited reactions (the existence of which might be questioned), it is entirely conceivable that an instinct may be both harmful and helpful. For example, the tendency of insects to fly towards a light is doubtless very useful to them in a majority of cases,

[1] J. Loeb, *Comparative Physiology of the Brain and Comparative Psychology*, 177–8.

but it is also destructive in many other instances, even under natural conditions. As man comes increasingly to dominate the earth and to produce artificial conditions in place of the more natural or primitive historical ones, he frequently makes use of his knowledge of the instincts of lower animals and of his own species to lure them to their destruction or hurt for his own profit or pleasure—sometimes even to the point of exterminating them.

Yet it may possibly be contended that in their origin instincts were always adaptive in the sense of being useful either to the individual or to the species; but we must be careful not to confuse as identical these two types of utility, the social and the individual. The interests of society may be quite incompatible with the interest of the individual. For example, it is to the interest of the owner of the textile mill to employ child labor, but such a policy is decidedly harmful to the state. Most social legislation registers an attempted solution of some phase of this conflict between social and individual interests. The contention that man has appreciably more instincts than other animals, especially those immediately below him, is at least not self-evident. By way of contrast, it is correct to say that man's activities are less under the control of his instincts than are those of any other animal. He has an infinitely larger fund of acquired directive traits and he also has a much larger development of mental technique, by the aid of which he may create new directive traits of an acquired character. To those who do not readily distinguish instincts from these acquired traits it might easily appear that man has more instincts than have the lower animals. With the statement that instinct "is native or inherited and not learned" it is possible fully to agree.

Many writers have contended that we must have a sound theory of the instincts. Such soundness cannot be obtained

from observations and classifications of half-analyzed automatisms on the one hand and by counting and classifying recurrences of phenomena in the social world on the other. We must supplement this general or speculative social analysis with an experimental analysis, such as is undertaken by the neurologists and experimental psychologists, if we expect to get at the truth of the nature of the instincts. Our present-day usage of the term instinct includes too many of the sophisticated and learned activities of man. Some of our writers apparently purposely include the acquired traits, especially those which are most closely related to the inherited automatism. On this basis there can never be any valid distinction between instinct and acquired character, and the more an attempt at accuracy in the definition of instinct is made under these circumstances the greater will be the confusion resulting. Other writers define instinct properly, as an inherited automatism or stimulus-response process, but they deviate from their definition in their actual usage. Our immediate goal must be to make definition and usage in this regard correspond. An instinct is an inborn (in the sense of inherited) activity process which has remained intact, that is, which has not been remade through the process of learning or of making new adjustments by means of the substitution of new stimuli or responses for the old which were inherited. This definition is well illustrated by the following characterization of the instinctive capacity of the fly: "The nervous mechanism is perfected, and when hatched and dry the fly makes its first circuit as accurately as if it had practiced the movement for days." [1]

If, however, it be insisted that instincts are not perfect without learning,[2] this may be admitted, at least as far as the vertebrates are concerned. Perhaps even the lowest organisms

[1] F. W. Gamble, *The Animal World*, 225.

[2] J. L. Mursell, *Psy. Rev.*, 29:166. See also Holmes, *op. cit.*, 96 ff., C. A. Ellwood, *Sociology in Its Psychological Aspects*, 203 ff.

modify their movements in response to new situations, as Jennings suggests.[1] One explanation of this, however, may be that the structures of the lower organisms are less definitely formed and, since protoplasm is extremely sensitive and impressionable when not organized into stereotyped forms, we would expect highly flexible lower organisms to be unusually responsive to variable situations in their environment. The insects, however, have that degree of fixity of structure which renders them better subjects for comparison with higher forms of life than are the lowest forms. The insects have relatively fixed modes of response, as in the case cited by Gamble above, and these we call instinctive. But the vertebrates show an increasing flexibility of action pattern the further up in the evolutionary process we go. The same is true of the incompleteness of structural adjustments at birth. It is said that the chick's first attempts at pecking are successful in only fifteen per cent. of the cases.[2] The human infant is even more helpless in its first adjustments. The fact is that the instincts, without practice, do not care for the adjustments of the higher animal types. They must first be overlaid with habit, whipped into shape by experience.

The obvious inference to be drawn from this fact would seem to be that instinct deteriorates in the higher animals, and especially in man, in that proportion in which the increased flexibility of the nervous system—made possibly by an increasing number of unclosed synapses at birth—tends to substitute habit organizations or mechanisms for the instinctive in functional adjustment to the environment. Habit organization is so much more efficient as an adjustment mechanism for higher forms that it soon comes to replace instinct organization ontogenetically; likewise, through the process of selec-

[1] H. S. Jennings, *The Behavior of Lower Organisms*, esp. ch. 13.

[2] F. S. Breed, *Behavior Monograph* S., No. 1, p. 31. See also Thorndike's studies in animal behavior for similar results.

tion, it is slowly replacing instinct mechanism for adjustment purposes phylogenetically. Instinct, at least in the sense of complex and elaborate mechanisms, is a diminishing, if not a disappearing, category in higher animal forms, especially in the human. The only complex instinctive mechanisms which remain intact in man are those which are connected with the vegetative, reproductive, excretory and similar primitive processes, particularly those controlled by the older autonomic and glandular adaptations. These function where the organism is most standardized and least subject to change. Elsewhere the complex instincts are being broken down or selected out and the organism is being thrown back upon the simpler instincts or reflexes for its native equipment. These, in turn, are being organized into acquired habit complexes.

These facts may be made clearer by means of an account of the evolution of psychic processes. This will be undertaken in the following chapters.

CHAPTER V

THE EVOLUTION OF NEURO-PSYCHIC TRAITS—HABITS

The term neuro-psychic traits is here used to cover all forms of behavior mediated through the nervous system, including the instincts at the lower extreme and the highest type of rational response at the other extreme. This chapter might have been called simply, The Evolution of Behavior, except for the fact that not all behavior is neurally mediated. The term mental traits is also avoided because it implies consciousness and some of the lower types of neuro-psychic adjustments are apparently made without consciousness. The emphasis in this chapter is more especially upon the organization than upon the functioning of the traits, and for this reason the term adjustments is not used in substitution for that of traits. It is the purpose in this chapter to show briefly how the structure and organization of the mind has evolved from the instinctive to the intellectual and rational, with a view to making clear the acquired nature and environmental control of the psychic mechanisms now most used in the processes of adaptation of the organism to its environment.

All intelligent behavior is neurally mediated and it rests ultimately, either phylogenetically or ontogenetically, upon the instincts and the reflexes and tropisms and the random tendencies, if these can be spoken of as separate from the other simpler forms of neuro-psychic mechanism. The lowest forms of animal life, although not without power of varying their responses to their surroundings, make essentially stereotyped responses to the environment upon which they are

dependent.[1] This is true up through animals of the grade of development of the insects. The vertebrates, however, show a very decided tendency to make variant responses to their environments. And we may say that the more highly differentiated the nervous structure in the vertebrates the more decidedly variant may be the reaction types which they are able to make in case of need. There is another correlation also which should be noted in this connection. Capacity for varying the response appears to be closely related to the fact of prolongation of infancy, which, on the one hand, is correlated with greater variability of neural structure, and on the other hand, with greater immaturity of neural structure during the earlier parts of the post-natal period. Those animal types which have the longest periods of immaturity are the most variable in their neural organization and possess the greatest power to acquire habits.

The fact seems to be that, other things being equal, the higher the type of animal the more complex the environment to which it becomes subject or sensitive. Types of environmental pressures which do not affect the lower life forms, or factors in the environment to which they do not respond, become quite effective with the higher animal organisms and demand responses from them. This greater imminence and development of the environment for higher forms and its more constant and insistent pressure upon them is due primarily to certain changes of which the animal types have become possessed. They have a longer life period, for one thing, and consequently survive through several seasons, while the lower forms, including even the insects, usually survive only through a single season.[2] Most of the lower forms live in the water,

[1] S. J. Holmes, *The Evolution of Animal Intelligence.*

[2] In the colder and more changeable climates, such as that of Iceland, insect life is limited in extent and in kinds. It consists for the most part of those types which have fairly ready movement and which have very short life periods.

which is a relatively uniform environment from the standpoint of chemical content, physical impact, temperature and light conditions. The higher forms of life live on the surface of the earth and are immersed in the earth's atmosphere, which permits of frequent and rapid changes of temperature, pressure and impact, and even of chemical contact. Many of the lower forms, especially of the insects, which live in the atmosphere on the earth's surface take refuge in the ground when it is necessary to render their environment more uniform. Others still undergo metamorphosis upon the approach of a new season, which fact protects them largely from disastrous environmental changes, although the purpose may be primarily something else. Differences in range of habitat and methods of locomotion are other factors which frequently separate the lower from the higher animal forms, especially with reference to their responsiveness to their environments. Most of the land-dwelling vertebrates have the power of traveling long distances and of changing altitudes readily, while practically all of the lower forms, including the winged insects, do not wander far nor ascend high into the earth's atmosphere. The birds especially have a very wide range of habitat and they are also particularly capable of modifying adaptations. They usually possess very large brains in proportion to their total bodily weight. And the most active types of birds are decidedly educable; they are not as stupid as most animals of the same evolutionary stage of development; and they display a constant and lively sense of danger, or are capable of perceiving and avoiding dangers as the result of experience. The power of vocalization and objective symbolization of the birds is greater than that of any other animal below man and this power probably has a close connection with their range of movement and the structural and neural variability attributes correlated with this fact. We might, perhaps, even state as a general principle the hypothe-

sis that there is a close functional relationship between motility and intelligence; that, other things being equal, the larger the range of movement of a type the greater will be its powers of intelligent, and non-intelligent or unconscious and unreflective adaptation to its environment. Necessarily this must be the case if the type is to survive the multitude of pressures of the environment with which such motility necessarily brings it in contact. Movement horizontally on the earth is perhaps more effective than movement perpendicularly in the air in increasing the power of variable adjustments, because of the greater variety of contacts and experiences which are available from the first type of movement.

Man offers another interesting instance of the influence of motility upon adaptability. While he does not possess the power to fly, except by means of mechanical devices, his power of manipulating his environment is much greater than that possessed by birds. He can bring himself into some spatial relationships with the earth and its inhabitants which are not possible to the winged species. But it is chiefly his power of manipulating his environment by means of the highly differentiated hand, which is controlled by a highly organized brain, that gives him his transcendent advantage over the rest of the animal world in motility and motor adjustment. What he lacks in rapidity of change of place he finds more than compensated by the fundamental and thorough way in which he makes his motor adjustments to his environment. His upright position figures as a minor factor in enabling man to make completer adjustments than the lower animals. Of transcendent importance in this connection, of course, is his power of communicating his ideas and impulses to others by means of speech and language. This affords him a social coöperative agency by means of which he is able, especially with the aid of written or printed language, to transmit his activity impulses to the farthest reaches of the earth. These transcendent traits or

capacities in man—brain organization, speech, hand—have combined to make him an inventive animal and have brought him directly under the influence of a type of environment which is infinitely more complex than any other kind or organization of environment which operates upon the animal kingdom. This is the psycho-social environment.[1]

First, then, man is an animal possessed of acquired technique. Other animals possess some technique in constructing and in modifying their environments of either an inherited or an acquired nature. But, even in the birds, this lower animal technique is not to be compared with that of man. Man is able in large measure to make his world over on the physical side. He builds aëroplanes with which to emulate the birds; he constructs railways and steamships which carry him quickly to all parts of the earth; he pierces mountains and takes from the bowels of the earth coal and iron and other materials from which he constructs machines by means of which he makes the most minute and the grandest adjustments to nature or subdues her. With the same equipment, internal and external, native and acquired, he constructs the printing press, the telephone and the telegraph, and communicates his ideas or will to all sections of the earth and makes them the common property of all mankind. By means of the telescope he penetrates the secrets of the heavens and with the aid of the microscope he discovers the infinite in the finite and solves many of the problems of the meaning and control of life. With his chemical technique he transforms the functional nature of matter and adapts it better to his uses. Everywhere man's inventive powers and his technology serve him as extensions of his natural organs, so that his legs become longer, his pace infinitely more rapid, his hearing more acute, his powers of vision are

[1] For a discussion of the nature of the psycho-social environment and of the way in which it is built up see paper by the author in the *Publications of the American Sociological Society* for 1921.

multiplied in range and effectiveness, and he grows in powers like a god and as if by magic. This power of acquired technique brings him into a vastly more extended and more complex world or environment and by virtue of the increased use of it the necessity arises for an even greater development of his technic powers of adjustment.

But above all, man lives directly under the influence of a type of environment which can operate upon the lower animals only indirectly. For the very lowest forms of life the operation of the psycho-social environment is exceedingly indirect. Only man possesses the powers of symbolization and of apprehension of abstract ideas which render him susceptible to the multiplicity of influences and factors which fall within the psycho-social environment. This is the most complex and insistent of all the environments, and it grows in complexity as man's intelligence grows and as his powers of adjusting to it increase. Only he is cognizant of tradition and custom, of convention and suggestion. Only he builds institutions and inherits them from the past. Only he multiplies knowledge and is dominated through his understanding by its abstract principles. But he is not the only animal who is subject to the power of the psycho-social environment. Every animal, domestic or wild, over which man exercises control, is affected by man's social organization and by his knowledge of fact and his valuations of relationships and conduct. But this is an indirect rather than a direct control, and it is operative only in so far as man is in functional contact with these lower forms.

This brief sketch of the expanding range of movement and of the adjustment capacities of the types of organisms, together with the expanding environment to which they are subjected in the evolutionary process, is intended as an introduction to a statement of the stages of neuro-psychic development through which animal organisms pass. The lowest

neuro-psychic stage is that of instinct.[1] The lower forms of animal life are controlled almost entirely by instinctive and reflex action mechanisms, although some degree of variability or modifiability in adjustment in response to environmental changes is to be found even among the protozoans. Also among the insects, which are much higher in the scale of development, the adjustment of the organism to the environment is overwhelmingly on the basis of instinct.[2]

But the animal organism becomes more complex and less mechanized in structure, and the life period lengthens and the motility increases as the process of evolution advances. At the same time the environment which operates upon the more complex organisms becomes more and more complex and detailed in its application and changes rapidly in its form. It consequently becomes necessary for the organism to change from time to time in large degree and rapidly the method and content of its adaptation. The growth of the environment,

[1] There is no intention here of denying the existence of even more primitive tropismatic responses which do not make use of neural mechanisms.

[2] The educable insect has not yet been found, despite the myth of the educated flea. It is generally recognized that the insects are more fully controlled by instinct than most other types of animals. In an attempt at an explanation of this fact E. L. Bouvier says, "It seems, then, that the extraordinary preponderance of instinctive activity among the Articulates has as its essential reason the differentiation and the multiplicity of the appendages, in other words, the chitinization of the integument and the formation of joint lines which result from it. From the beginning these animals were doomed to use organic instruments, and they made the best use possible of these. Their main psychical task consisted in engraving upon their memory and in instinctively repeating the acts to which these organs were adaptable."—E. L. Bouvier, " The Psychic Life of Insects," *Annual Report of the Smithsonian Institution*, 1918, p. 459. See also *La Vie Psychique des Insectes*, by the same author.

The opinion is held by some that insects devolved and became mechanized and smaller to fit into the unoccupied vital adjustments of animal evolution. That is, they were, in the opinion of those who hold this view, sidetracked from the main line of evolution and had to fit into the world of life as best they could. It is difficult, however, to see how a high development of instinct would help in such an adjustment. On the other hand, the theory of regression would seem to correlate with the decidedly instinctive character of the neuro-psychic control of insects. See S. S. Chetverikov, "The Fundamental Factor of Insect Evolution," *Annual Report of Smithsonian Institution*, 1918, pp. 441–9.

both in complexity and in concrete detail, is closely parallel to the ascent of the organism in the scale of development. The two types of development apparently interact upon each other. The differentiation of the environment calls forth a differentiated development in capacity to respond on the part of the organism. Likewise the developing organism, especially in the human type, reacts upon its environment and creates a greater complexity and capacity in the environment to stimulate response on the part of the organism. This creative function of the organism, with respect to the environment, is seen at its maximum in the making of the psycho-social environment, which is man's greatest achievement.

In some cases it is necessary to make rapid changes in temperature adaptation. To a certain extent nature takes care of this, by providing coats of fur or feathers which may be manipulated automatically by the neuro-muscular system and glands in such ways as to increase or diminish the body's retention of heat. In other cases perspiratory glands, also automatically and instinctively operated by an internal mechanism, keep the body at a fairly even temperature on the surface. In man his forethought supplements these instinctive controls with the aid of fire, shelter and clothing and other temperature controls aimed at cooling the body. Intelligence comes in here to coöperate with or to displace instinct. In this case the adjustment is made for the most part (and, as far as this illustration is concerned, wholly) by means of instinct by the lower types; but only partly so by man. Yet, even the lower animals may learn to seek the shelter of a windbreak or the protection of a cave or come close to a fire for the purpose of warming themselves. In such cases they act in part from instinct—the reflex response to pleasureable warmth—and partly from the lessons of past experience which have taught them that comfort, or at least the absence of pain, lay in that direction. This

illustration is, however, rather complicated. Let us take a simpler one.

Suppose a land animal loses a leg. It is equipped instinctively for walking on four legs, provided it is not an insect, a bird, a kangaroo, or a man. Yet in the course of a short time any animal which can support itself on three legs will adapt itself to the process of locomotion on three legs, in the absence of a fourth. This is clearly a case of habit adjustment modifying an instinctive one. Or, again, animals which lose their sight learn in due course of time to reorganize their instinctive and acquired technique by employing the other senses as adjustment aids in such ways that they can regain much of their former efficiency in the life struggle. In some cases, however, the loss of a sensory adjustment mechanism may be such a serious matter, especially where there is little margin for variation in adaptation between the adjustment organization within the animal and the environment controlled by this organization, that the animal is not able either to survive the period of readjustment of its control organization or is not able to bridge the hiatus with its insufficient sensory or muscular technique, and it perishes. On the other hand, in some of these cases, as in that of the adjustment of the organism to the environment on the basis of the sense of sight, the full efficiency of the adjustment is not attained except through a partial process of learning. This is certainly true in the case of man, who does not at first see either colors, or depth, or measure size or solidity by the eye.[1] Whether the lower animal acquires the power of seeing depth and color we can only conjecture, but there seems to be good reason to think that it is not wholly different in this respect from man.

[1] W. B. Pillsbury, *Fundamentals of Psychology*, Ch. 4 ff., and W. M. Feldman, *op. cit.*, ch. 36.

In these cases the modification of the original instincts through habit formations apparently takes place without any self-consciousness or conscious memory of the process which would render it representative. The former case, that of learning to keep warm by establishing the habit of seeking shelter or approaching a fire, obviously must involve the action of some sort of reinstatement mechanism or conditional association, even in animals decidedly lower in the scale of evolution than man. It is easy enough to imagine lower animals using a substitute sense or an acquired walking mechanism without the aid of memory and representative consciousness, but it is difficult to conceive of them automatically seeking shelter from the cold in a cave or in the environs of a fire without some sort of conditioned association to control the act. The one is an immediate physiological habit adjustment set up within the animal's organism itself and is not dependent upon exteroceptive sensory adjustment. The other is an adjustment made largely at a distance through the exteroceptive senses, as well as through those senses more closely connected with the autonomic nervous organization. Such an adjustment is more likely to involve consciousness of a representative sort. The lowest organisms do not make such complex adjustments—those through the higher exteroceptive senses of sight and hearing—at all, because they do not possess exteroceptive senses sufficiently well developed to take care of the details, or a brain organization which can utilize perceptions for purposes of control. It is mainly through these two higher exteroceptive senses, sight and hearing, that the sensory materials for consciousness and memory come.

The distinction between the two types of cases—the modified adjustment made mainly or wholly on the basis of organic internal processes and the adjustment mediated primarily through the exteroceptive senses on the basis of conditioned associations and reinstatement mechanisms—can be made

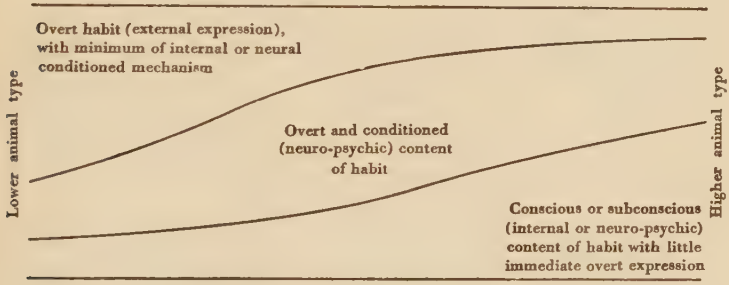
more striking and may be further extended to higher levels of adjustment, including consciousness, by taking a more pronounced instance of the second type. Such might be the case of a man learning to avoid some danger, as for example a savage avoiding a cave frequented by a bear or other ferocious animal. The act of avoidance, in the case of the human being, involves the perception of danger, of possible injury, by means of the exteroceptive senses and (in the case of man) memory. It also involves the perception of place and of avenues of escape, and the like. Once these connections have been made through the aid of the exteroceptive senses of sight, hearing, and smell, the man need only see the place where the danger is to be incurred, or something which is associated with this place, or hear some sound or smell some object similarly connected with it, to take alarm and hastily beat a retreat. Did this act of retreat upon the perception of a cue to the danger or the dangerous place take place with or without memory of the previous dangerous experience? Does the mind of the man call up imagery tending to restore neuro-psychically this dangerous previous experience and then, following this restoration of the event—in memory—perform the acts of escape as on the previous occasion, except for any variations made necessary by changes in the environment? Or does the man act automatically without defined consciousness and without memory recall upon the perception of the cue to the dangerous situation, merely by means of the neuro-muscular reinstatement of his motor impulses on the basis of the conditioned associations which have been formed? Either supposition is tenable, but ordinarily we assume the operation of the latter processes for animals below man and the former for man himself, as the explanations of the adjustment processes which appear to be the more plausible in the light of the facts as we know them. The lower the animal type the slighter and less well-defined the conscious content connected with such an act

of avoidance; but also we may say, the lower the animal type the less well defined and efficient the act of avoidance following the perception of the cue to the danger, unless it has an instinctive or a conditional mechanism for avoidance which is set off automatically upon the sensory appearance of the cue. There is, apparently, a correlation between the degree of conscious control and the efficiency of the act in such cases, at least before the act is reduced from a conscious performance to the status of an automatic or habitual act.

If the argument is well founded, and if the illustrations are well chosen, we may be justified in speaking of three types of habits—(1) those that are primarily organic and overt, not involving awareness and memory, (2) those that involve the overt organic adjustment with a developing neuro-psychic mechanism depending on conditioned associations and reinstatement mechanisms, that is, those that are both overt and internal in their mediation, and (3) those which are internal and conscious primarily (although there need not be self-consciousness in such cases) and which have but a small overt activity content or correlation. This last type of habit organization is of the nature of a habit of thought—either conscious or unconscious—with primarily a neural instead of a muscular or a neuro-muscular organization. Its method of formation and its significance for the later stages of human social development will be discussed subsequently.

The first of these three types of habits appears in the lower types of habit-forming animals. In fact it may be said to be characteristic in some degree of the lowest or almost the lowest forms of animal life, according to the findings of Jennings and others. However, it does not become pronounced as a method of adaptation until the process of animal evolution reaches the stage of the vertebrates. The other two types come into play higher up in the scale of evolution, the third type scarcely manifesting itself before the advent of

man, who is the thinking animal par excellence. One error of interpretation must be avoided in this connection, and that is the tendency to think of these three stages of habit formation as definitely distinct. Each subsequent stage or type begins long before the preceding one has reached its maximum development, and each previous type persists long after the next succeeding one has come fully into play. This overlapping and the relative importance of these types at any one time may be graphically illustrated by means of the following diagram.


Overt habit (external expression), with minimum of internal or neural conditioned mechanism
Lower animal type
Overt and conditioned (neuro-psychic) content of habit
Higher animal type
Conscious or subconscious (internal or neuro-psychic) content of habit with little immediate overt expression

This diagram is intended to represent only the relative, not the absolute, importance of the different types of habit organization.

Overt habit adjustment is dominant among lower animal forms, in so far as habit adjustment is operative at all. Among the lowest living forms it occurs without dependence on a nervous system, but as a nervous system evolves overt adjustment mechanisms make increasing use of it, until finally some signs of psychic processes begin to appear and these in turn come to play a cumulative rôle, advancing in the final stages of their development to dominance of the adjustment processes. The mixed type of habit adjustment is merely a transition process and exists only as a composite fact, and not as a distinct competing principle. Gradually the dominantly conscious (and

subconscious) or internal habit adjustment comes to be dominant over the other types. In this last stage, which is essentially human, adjustments are made in the neural processes before they are made overtly or by the muscular and osseous system. If we diagram the process of the growth of types of habit adjustment on the basis of the competing principles of overt and internal or neuro-psychic technique, and leave out the mixed or overlapping habit-forming process, we have the following figure, which is perhaps truer to neurological and physiological fact than the preceding one.

Lower animal types
Overt habit adjustments, involving a minimum of internal neural or conditioned adaptation
Internal neuro-psychic (conscious and subconscious) habit adjustment, involving a minimum of preliminary overt adjustment
Higher animal types

On the basis of the previous discussion we may now undertake to diagram the different stages of the development of neuro-psychic technique in making adjustments between the organism and its environment. Here again we must warn the reader against interpreting the diagram to mean that the different stages are sharply separated, one from another. To some extent this overlapping can be made clear in the content of the diagram itself. A neuro-psychic trait or process, once it appears, remains as a part of the adjustment mechanism of the organism, although its relative, or even absolute importance, may ultimately decline. Possibly both phases of the importance of both instinct and overt habit have declined in the biological history of the human species. Also, the diagram illustrates the fact that the higher or more abstract and intellectual types of neuro-psychic technique are superimposed upon the lower ones. They do not come directly in contact with the lowest types, such as instinct and overt habit, except

in an ever-diminishing number of cases, because each succeeding superposition modifies the operation of the underlying process or technique. Consequently, the lower processes with which the higher processes ordinarily come in contact and to which they adjust are modified processes. This is really the

					Written language (Potential habit)
				Vocal language	Vocal language
			Internal habit (neural)	Internal habit (neural)	Internal habit (neural)
		Overt and internal habit	Overt and internal habit	Overt and internal habit	Overt and internal habit
	Overt habit	Overt habit	Overt habit	Overt habit	Overt habit
Instinct	Instinct	Instinct	Instinct	Instinct	Instinct

explanation of the statement often made by the psychologists, and emphasized in the quotation from Professor Warren in the preceding chapter, that adult individuals have few unmodified instincts. Man literally rises by means of a stairway of habits from adjustment on an instinctive basis to adjustment on a rational basis, passing through, on the way, various stages of conditioned adaptations.

The overt habit, as described above, comes into the adjustment process where the instinct mechanism becomes inadequate to the adjustment needs of the organism, because of the

greater complexity of the environment perceived or reacted to by the more specialized animal type. The overt habit is not necessarily without any definite neural correlate, for ordinarily overt or external action cannot occur except in correlation with neural stimulus-response pathways.[1] Also all habits, overt or internal (neural), are built upon instincts, which are neuro-psychic processes. However, the overt action response may be without conscious neural correlation, since the inner or neural adjustments may take place at sub-cortical levels. Since the lower animal forms are not equipped for conscious direction of the adjustments of the organism to its environment there is either no opportunity or no necessity for bringing the inner adjustment process into the higher brain centers, which are probably inadequately developed for handling such matters. Consequently, so far as conscious control or organization is concerned, the new adjustment on a habit plane is characterized primarily by overt or muscular mechanisms, with a basis of unconscious or unintelligent instinctive neural mechanism.

The overt habit mechanism merges gradually and insensibly into the mixed type, where both the overt action adaptation and the conscious neural organization take place at the same time. In general it may be said that as the conscious adjustment grows the overt process of adaptation tends to be shortened, more and more of the adaptation taking place in the neural centers without being transferred to the muscular and glandular systems for execution in details. That is, the overt action adjustment is increasingly limited to the approximate and ultimate end processes, the intermediate processes being worked out in the nervous system, under either conscious or sub-conscious control. In the third stage of habit formation, where internal or neural habits predominate, this elimination of the bulk of the overt adjustments, leaving only the end

[1] See discussion of some exceptions in Chapter III, above.

results of the adaptation to be executed by muscles and glands, reaches a high degree of completeness. Here we have habits of thought or of thinking largely taking the place of the bodily or overt organic habits.[1] When this last stage is reached the individual has already begun to make his adjustments on the basis of abstract or symbolic thinking. The symbols represent activity values, in more or less disguised form, which themselves never or rarely go into overt execution. In the case of the most abstract symbolization, especially that of a quantitative or mathematical sort, the similarity of the abstract symbols to action patterns or mechanisms is not at all recognizable. In such cases the symbols merely represent potential action or action values.[2]

The uncorrupted instinct gives place in this manner to the modification which we call overt acquired action or habit, because the animal cannot meet the demands of his environment on the basis of his instinctive mechanisms. Environment changes and the unmodified operation of instinct would maladjust or misadapt him rather than give him a functional alignment with his surroundings. Flexibility has to come into the neuro-muscular mechanism to save the animal and its type. Evolution itself, at least in the second dimension which we may call progress,[3] cannot go on without this expanded capacity for adaptation. A type of animal life controlled wholly in its adjustments to environment by instinctive mechanisms could survive only if it existed in a relatively static world; it would perish in a rapidly changing environment.[4]

[1] The term habit is, of course, here used in the sense of an acquired or modified adjustment rather than in that of a mechanism which tends to repeat itself without modification.

[2] For a much more extended account of this development of neuro-psychic technique see writer's article, previously cited, in *Psy. Rev.*, Nov., 1923.

[3] See L. L. Bernard, "The Conditions of Social Progress," *American Journal of Sociology*, July, 1922.

[4] This may be the reason why the insects have appeared to some entomologists

In like manner the growing complexity of the environment and the evolving and differentiating nature of the type in the course of time render adjustment on the basis of the overt habit mechanism inadequate to its needs. The difficulty here is not alone in the fixity of the mechanism which undertakes the adjustment of the organism to the environment, but also in the time which is required to effect the adjustment. In the case of the purely overt habit mechanism, every process of the adjustment must take place through the muscles. No detail or incidental process can be omitted unless the continuity of the action itself is to lapse. Muscular and bodily movements are extremely time-consuming. They are also fatiguing and thus limit the powers of the organism to consummate its adjustments on the overt basis. We observe these two limitations of time and fatigue at work in the attempts of a lower animal to escape from a trap or a maze. It runs to and fro ceaselessly, attempting with its *whole body* to find a new adjustment which will set it free from its physical restraints. The human being might react in much the same way at first, if placed under similar circumstances or environmental conditions, especially if under the influence of emotional excitement, but it would tend—if normally intelligent or capable of internal habit adjustment—to work out the problem of escape in the mind, thus saving the time and energy involved in the so-called "aimless" movements of the whole organism for application to the end process of escaping after the preliminary processes had taken place internally or neurally. The animal types using the overt habit adjustment exclusively or

to be a regressive type. Their fixity of instinctive organization undoubtedly makes it necessary for them to adapt only to a highly selected environment—one in which temperature change and competition from other organisms are reduced to a minimum by means of subjective organic adjustments in the nature of a limited life period, protective mimicry, etc. Of course the insects do not come directly into the range of the psycho-social environment at all; and when they come indirectly in contact with it it is with disastrous results to themselves.

primarily would not be able to accomplish any marked achievement in the control of their environment merely for lack of time and energy saving, even if their lack of inventive capacity were not a fatal handicap. Invention is primarily a matter of internal habit adjustment or abstraction, made overt finally in the application of the results of the internal adjustment processes to the end processes of adjustment.[1]

The internal type of adjustment is a great time saver. It dispenses with the overt adjustment except where it is necessary to carry the results of the internal adjustment—which are, in their higher forms, rational conclusions—into operation, or so to manipulate the environment as to give a basis for further internal adjustment. Of course the internal adjustment process is never ideal or perfect, just as the overt process is never perfect or wholly effective. There are necessarily many hitches in the process of thinking an adjustment situation through, even where the most abstract processes of thinking and symbolization have been developed as aids in the internal processes. Also, it is not always easy for the internal processes to inhibit the overt processes from action, with the consequent interference with the internal or thought adjustment which such overt action brings. Usually, however, the inadequacy of the internal adjustment process results from what we call lack of data. Either adequate symbols of the environmental pressures are lacking or the end results cannot be properly foreseen. Facts or data depend upon the power of the internal—usually conscious or thought—mechanism to visualize or apprehend the relationships of the environment to the organism. Data are such symbolizations of the environmental relationships. Where this symbolization does not exist in adequate degree or extent and the internal

[1] See article by the author, "Invention and Social Progress," *American Journal of Sociology*, July, 1923.

adjustment process cannot go on through a process of abstraction and valuation, the overt action must intrude and carry on the adjustment externally, although in a more or less random and uneconomic manner, until the internal processes can pick up the thread of abstraction and symbolization and help the process on a more economical plane.

The mixed type of adjustment occurs in just such situations where there is inadequate power or experience for abstract and symbolical adjustment. It ordinarily occurs in those forms of animal life where the cortical conscious mechanisms are just coming into functional operation, but it may and does occur among thinking men—even among philosophers—when they find themselves in strange or incompletely understood situations. At such times the adjustments cease to be abstract and rational and are interrupted by more or less random movements which often give the appearance of high emotional excitement in the subject. The process of "getting hold" of a situation is to bring the uncompleted adjustment process back to the inner basis and think out the plan of action before there is any attempt to execute it. When this is done, not only is time saved, but also there is less waste movement and loss of energy. Also, which is an important consideration, there is a much greater degree of accuracy in the adjustment. The accuracy of the internal adjustment depends on the accuracy of symbolization of the relationship between the environment and the organism, that is, the accuracy of the data available. Where this accuracy is complete and dependable, and where the process of internal adjustment is not interrupted by uncontrolled overt habit action, a rational plan of conduct and control of a high order can be worked out and put into execution.

CHAPTER VI

THE EVOLUTION OF NEURO-PSYCHIC CONTROLS — INTELLIGENCE AND LANGUAGE

Out of these general overt and inner neural adjustment mechanisms, discussed in the preceding chapter, or as phases of them, develop many subsidiary adjusting mechanisms of vast importance to the individual and society. The most important of all of these is undoubtedly speech and language. In fact language may be said to be the symbolizing mechanism par excellence, whether it be the language of gesture and mimicry or the language of speech. Without it, especially in its more highly and abstractly developed forms, where symbolization is most completely developed, abstract thinking or inner neural adjustment in its most effective forms, could not have been developed. Language symbolism is the chief symbolic content of the inner neural or conscious and subconscious adjustment processes. This fact has been shown to be true by those who have investigated the content of thinking. They have shown that thinking is conversational in form, whether it takes place in contact with others, or is the thinking of the silent and isolated individual. Only the most abstract thinking drops the conversational form of ratiocination; and even here the symbolism, however abstract, is that of language, but of written rather than of oral language. Oral language symbols constitute the content of the conversational or ordinary everyday thinking processes.[1] People who have long been isolated from conversational contacts, such

[1] See C. H. Cooley, *Human Nature and the Social Order*, esp. chs. 3–6.

as hermits or insane people of certain types, often develop the habit of engaging in audible conversations with imaginary or hypothetical persons as accompaniments of their thinking.[1] When excited or under great emotional strain anyone may lapse into the oral symbolism or audible conversational form of thinking. Prayer probably has much of this element in it, and revelations from divinity may be explainable, in part at least, as conversational thinking in prayer, projected into the hypothetical mind or mouth of a divinity or a saint or holy spirit.

Such is the intimate connection between language and habit. The instinctive element in language is relatively simple and amorphous from the standpoint of intellectual content. The general tendency to vocalize may be spoken of as instinctive only in the most general sense. Such tendencies may be described as random in the same way in which we speak of random movements, when these movements spring from a metabolic basis and are not definitely directed toward or correlated with particular objects. In the same way random vocalizations are not definitely correlated with definite meanings and do not serve as stimuli to definite activity processes in others. But, like random movements, random vocalizations do serve as valuable raw material out of which definite habits of speech may be formed. Much of our speech forms and content, on the neuro-muscular side, go back to these random vocalizations as basic content. There are, however, definite instinctive elements of a simple sort in speech and language. These are cries of various kinds and with various emotional values or appeals. The child probably instinctively makes certain calls or cries for help, and the mother possibly responds more or less instinctively to them. But even these instinctive calls of the child are general in character, that is, they are not specific to any type or types

[1] Compare E. A. Ross, *Principles of Sociology*, ch. 10.

of objects exciting fear. All objects causing pain or discomfort or fear (if the fear is instinctive) produce the same type of call or cry, varying only in volume, intensity or continuity, according to the persistence or intensity or character of the stimulus. It is doubtful whether the infant's vocal expressions of satisfaction and affection are instinctive. They are more probably learned early, being built up out of random vocalizations on the one hand and, on the other hand, closely correlated with the instinctive tendency of the face to relax in the general way which later comes to be known as a smile, when the organism is at rest or the organic needs are satisfied.

Almost the whole of the vocal content of speech or language is acquired and the whole of the written symbolical content of language is learned. The acquired elements in these two forms of language come in a very minor degree from the individual's own experience and by far the greater degree or volume from the experience of the race in the past or the present. Both oral and written languages are based on both the overt muscular and the inner neural types of adjustment mechanisms. In the case of oral language or speech the tendency for overt muscular expression to accompany the inner or conscious neural adjustment becomes specialized to the vocal cords. In the case of writing the muscular or overt expression tends to be specialized in certain muscles of the body, especially of the hand and forearm, but also to some extent in the set of the lips and the angle at which the head rests upon the neck and shoulders, which have acquired a secondary or non-functional adaptation to the act of writing, or rather accompany the overt process itself. This overt expression of the inner conscious or subconscious adjustment of the neural mechanisms through hand and vocal cords is not immediately necessary to the act or process of thinking. But it is indirectly and ultimately necessary to thinking, for the

processes of thought cannot go on without the use of the symbols of speech and of writing, and the most abstract and economical thinking processes are possible only with the aid of the highly compact symbols of writing, such as the formulæ and signs used in the various sciences. Thinking and overt expression, as language, are reciprocal processes. Thinking is developed as a process dependent upon the technique of language symbolization and organization on the one hand, and, on the other hand, there must be organized an adequate language expression of thought content as a means to the development of further symbolic language content or technique to serve as a basis for further advances in thought. While thinking can go on for a long time without overt expression in either form of language, it cannot continue thus indefinitely without impairment of its efficiency. People who do not express themselves in speech or in writing, or do not at least read books—which is a highly specialized form of conversation—lose the most characteristic vigor or power of thinking, and in the end they are likely to cease constructive thinking altogether.[1]

If inner neural adjustment, which at its best is thinking, is an economical and more accurate or efficient substitute for overt muscular adjustment on the automatic habit or instinctive action basis, so may oral and written language be considered as an economical and more efficient substitute for overt

[1] Thoreau is an interesting example of a man who lived a more or less isolated life but preserved the vigor of his thought primarily by selecting his companions because of what they could contribute intellectually and especially because of the books he read, which brought him in contact with the best minds of all ages. He had early acquired the habit of careful and intensive observation of natural and human phenomena, reflecting upon what he observed, a fact which goes far to explain the persistent vigor of his intellectual processes. He illustrates well the saying that one may do well to withdraw from the world in order to enjoy the best fruits of its great intellects and to produce most—at least of a certain character—of his own thinking.

habit and instinctive adjustments not directed, or less directed, by the inner or conscious neural mechanisms. Language introduces a new economy into the overt adjustment process. It not only symbolizes the inner, abbreviated and rationalized neural and psychic adjustment going on within as a substitute in large measure for a totally overt adjustment of the organism to the environment, but it also introduces a social or coöperative element into this abbreviated and better defined adjustment process. Since language is a mechanism for communication as well as a mechanism for thinking, it makes it unnecessary for the individual to perform all his adjustments for himself alone, by exchanging adjustment services or even by organizing some of them on a coöperative community basis. Coöperative adjustments, or the exchange of services, both in the making of overt adjustments and in the making of the inner or thought adjustments, not only shorten the process by which each individual finds his adaptation but also increase enormously the volume of adjustments which can be made. This last service of coöperative adjustment, made possible by the use of language, is especially important in our highly complex social organization. Indeed, such organization would not be possible without language as the medium through which the inner adjustment mechanisms are effective in the coöperative or social adjustment process. Man's environment has come to be primarily a psycho-social one, with its content of institutions, customs, traditions, conventions and the like, and these are able to keep their form and their continuity only with the aid of language. They are abstract social entities having their roots in the thought and action of men—the inner and overt adjustment processes,—and they must be organized and communicated through language. There is no other means and medium through which they can maintain their identity and continuity.

It follows, therefore, that both spoken and written lan-

guages, operating as they do as the chief social servants of the mind, are of the greatest importance to civilization. Without them civilization could not have evolved; they are the chief carriers of the content of civilization. Of the two, written language has rendered the greater service to civilization, especially in its later development. Oral language gave man a medium of communication which made possible the development of coöperation over such areas as the voice would carry or as the spoken word could be transmitted effectively from mouth to mouth. Such communication was of especial service in the coöperative protection against enemies and in procuring food, especially after the securing of food by the simplest methods of direct appropriation had given way to hunting, fishing, grazing and agriculture. Spoken language also made possible the transmission of valuable technique and knowledge of all sorts, not alone horizontally, from person to person, living contemporaneously, but longitudinally, from the people of one generation to those of future generations, almost without end. Traditions came into existence with a language rich enough to carry their content. Customs were enriched by it and given effective volume. Technique, both of the practical physical sort and of the magical kind, multiplied greatly. Institutions were not possible without spoken language, but with it they reached a high degree of complexity and effectiveness. Without science, their effectiveness exceeded their utility, in many cases. With oral language man became a thinking, coöperating, social being, as well as an acting animal. His effectiveness, immediately and ultimately, was vastly increased. Spoken language brought the prehistoric stages of our culture into flower.

But the higher or historical stages of culture could not develop without the aid of written language as the carrier of their content. Written language increases somewhat the range of communication and hence of potential social coöperation. It

increases vastly the volume of communication. For, as voluminous as is talk at all stages of human development and especially now,[1] with its increased facilities made possible by use of the telephone, it cannot begin to compare with written language where volume is multiplied by distance or extent. The newspaper and the movie, the magazine and the book, carry a very large content of ideas much more uniformly over a wider area than would be possible by means of spoken language alone. Many ideas, especially of the more serious sort, would be lost or greatly diminished in extent of reach and volume if they had to be sifted through all types of minds, many of them poorly prepared for such transmission. On the other hand the carriers of written language can pass over such minds not prepared to act as transmitters of the more abstract ideas and reach other minds in considerable volume far from the center of transmission. These minds, even on the outskirts of the geographic area of the written or printed carriers may serve again as centers for vocal or written transmission of the same ideas. But the greatest advantages of written language arise from its superior accuracy and its greater permanence. The same danger of breaking the thread of communication which exists with respect to lateral transmission, where untrained minds have to act as the media of transmission, is to be found also where the transmission is from generation to generation in the form of tradition or belief or technique. Disturbed times, the untimely death of the bearer of the wisdom of the race, before his successor had been fully initiated, conquest by a more warlike but more ignorant group, or other unexpected or unfavorable events, might easily cut the thread of transmission, as historic facts amply prove. This danger was all the more real the more difficult the ideas to be communicated or the technique of transmission (language) to be mastered, or the greater the sacredness of the content, with the conse-

[1] See Walter Bagehot on "Talk" in his *Physics and Politics*, ch. 5.

quent restriction upon the numbers of the carriers of the sacred or valuable possessions. Likewise, the content of the transmitted ideas or control technique was almost certain to undergo modification and, ultimately, possibly complete transformation when passing through a great many minds. This tendency towards modification is well illustrated by the changing character of the content of gossip in contemporary society.[1] The same difficulty is to be encountered in some degree in connection with written language. One of the reasons for the existence of the "higher criticism" of the sacred writings of any religion is that copyist and commentator have from early times added to the text or taken from it, in spite of the (interpolated?) threats of *Revelation*.[2] Such additions and mutilations are, however, much more difficult in the day of printed books and preserved first editions. The written or printed content of the language can be handed down from age to age regardless of the refracting medium of individual minds and public opinion, for it does not pass through minds; it passes *to* minds.

In another, but related, sense also written language is better able to preserve its content with accuracy from generation to generation. The more abstract and highly symbolical content probably could not be transmitted intact orally through a sufficiently large number of minds to make it generally available for the use of a whole people. Hence, a high degree of intellectual culture could not arise with merely oral transmission from generation to generation, before the advent of written language. It is necessary to have a less destructible medium to preserve the content intact until it may be absorbed by a sufficiently large number of people to render its cultural content widely diffused.

[1] For an excellent example of how content may be modified by gossip see C. G. Jung, *Analytical Psychology*, ch. 4.

[2] XXII, 18–19.

In the matter of the volume of ideas or knowledge which may be communicated, the advantage is overwhelmingly with written language. Long ago, with the aid of writing and printing and a highly developed symbolism of expression, the volume of the cultural content of civilization outgrew the capacity of the human brain to remember and transmit economically. The troubadour and the minstrel were the first general carriers of the folk wisdom, and in order to gain a general hearing and support their wares had to be primarily popular in content and literary in form.[1] Even the philosophers no longer attempt to write into systems of interpretation the whole content of human knowledge. Nor can the scientist any longer master the whole of his own field. The very process of knowing, as well as of transmission, has now come to be coöperative. General treatises on a single subject must come more and more to be written by a group of men, which is the reverse of the former practice by which one man wrote a group of treatises.

Even the learned man no longer attempts to carry in his memory the whole content of his specialty. He remembers those ideas and facts and formulæ which constitute his most frequently used working tools, just as the plumber carries his most necessary apparatus about with him in his kit. The rest of the pertinent data—the less frequently used tools—are kept in convenient storage places, in cyclopædias, files, books,

[1] Even written language in our day suffers from these limitations of form in order to secure a wide reading. The novel, play and poetry are examples of the distortion of ideas—or rather of the non-maturing of ideas into abstract symbolical content—by means of which they are brought or kept within the range of the average mind. On the one hand, such writing is a survival of the old method of part-intellectual, part-action content of speech, where the ideas which could not be grasped by the abstracting processes of the mind could be apprehended through pantomime or gesture. On the other hand, it represents the application of the modern refinements of the psychological arts of suggestion, symbolized in language, as methods of appeal to the emotions. Thus, there are both primitive and modern elements in modern popular writing for the reading public at large. But in both cases the abstract intellectual content is minor and the emotional symbolization of action is dominant.

notes, etc., just as the plumber has a large supply of tools in his shop to be drawn upon in case of need. Libraries and museums are the great storage places for the data which are too voluminous for oral transmission or to be carried by the specialist in his memory. The specialist remembers the key facts and formulæ and draws from the storage places additional material to apply to the solution of any particular problem. This is true not alone in theory, where new interpretations of phenomena are being worked up in the abstract, but it is equally true of the applied sciences. The physician does not carry all the knowledge he needs in his head, but constantly consults the medical journals and libraries. The engineer does not remember all the formulæ he needs to use in his profession. He merely learns the methods by which he may apply data to the solution of problems and such formulæ and facts as he will most frequently use. The rest he is prepared to draw from the *Engineers' Pocket Book* or *Year Book*, with its multiplicity of tables, formulæ, and data of all pertinent kinds. In cases of greater urgency he consults the libraries and the technical journals or specialists.[1]

The whole method and process of education is being transformed because of this vast increase in the volume of knowledge or data which has accumulated and which can no longer be transmitted orally in full. The old ideal of education was to stuff the memory as full of facts, formulæ and laws and principles as possible. Thus the educated man was a walking magazine ready to explode upon the relatively ignorant upon occasion.[2] This stuffing process is no longer successful, be-

[1] For an elaboration of this point, see the author's article, "Theory, Practice and Progress in Social Work" in *Hospital Social Service Magazine*, May, 1923.

[2] One still occasionally meets an individual of this type—people who scintillate with ideas or facts drawn from all quarters and shower them upon their less voluble victims until they are suffocated or dazzled by the brilliancy without content. Such people are properly regarded as superficial, because they present in their conversation vast collections of data without conclusions; they do not generalize. The thinker is ordinarily not a good conversationalist, except

cause no mind can comprehend even a large fraction of the accumulated and stored data.

The modern ideal or aim of education which has superseded this earlier one is to train the mind of the thinker to locate, discover and utilize data in the solving of the problems which he will encounter. This involves three major processes. First, the student must be taught the classification and location of facts and data, that is, the tools which he will use. This naturally involves instruction in a considerable knowledge of the more important and frequently used facts and data themselves. It also involves instruction in the organization and content of libraries, card catalogues, cyclopædias, and the like. Second, he must be taught the key sciences, chief of which is mathematics, which unlocks the doors to all other sciences or to scientific method in all fields of knowledge. But there are other great key sciences, such as physics, chemistry, biology, psychology, sociology. Their basic data and their leading formulæ are indispensable for the understanding and interpretation of the data in these general fields and in the special sciences based upon these general sciences. Third, there must be training in methodology or in the concrete methods of induction and synthesis in the theoretical fields and in the technique of the applied sciences, as a means to making the data stored outside the memory content of the thinker practically available. One thus educated is equipped for effective thinking or practice. He has a satisfactory basis in his knowledge of fact and formulæ for work; he knows where to secure the materials which he does not carry in his memory; and he understands the methods of effective thinking and practice.

---

in his specialty, and there he is not likely to have many companions in an ordinary social group. His tendency to abstract into formulæ takes him out of the range of the symbolization of most of his companions who are enjoying the emotional impact of random data which they shoot at each other with intellectual popguns in the form of scandal, puns, the miraculous, paradoxes, etc., which constitute "brilliant" conversation.

Such a person is educated in the most effective sense for modern life and thinking.

Thus, with the development and extensive utilization of written language, actual habit tends to be replaced very largely by potential habit. That is, while oral language always proceeds directly from the neural organization within, written language, when stored outside of the memory, does not, when transmitted, necessarily proceed directly from the neural processes within. Ultimately it must proceed from such sources. But, in a certain sense and to a certain degree, it is self-perpetuating, that is, it may be transmitted without becoming actually a part of the intellectual possessions of the transmitters. In this way an ever-increasing proportion of mental content becomes potential instead of actual at any one time. This potential habit—directly inner or conscious and indirectly overt, in content (for the overt can come into existence in such a case only through the inner adjustment processes)—is stored outside of the muscular system and the neurons of the organism which may utilize it. Only by being taken into the consciousness through the key methods and processes above described is it possible for it to become a part of the actual organic adjustment content, either neuro-psychic or neuro-muscular. It follows that the larger part of the human mental content, at least potentially, is stored outside the neural processes. It is brought into the consciousness and the neural adjustment content only upon need or upon occasion and there utilized and finally transferred in its end products to the overt adjustment processes. The final form of habit adjustment, as a substitute for instinctive adjustment, thus comes to be potential and external. It is stored in books, museums, even in the rituals and verbal credos of men which have lost their conscious significance, and in the material external controls which guide our movements automatically. Only

the key processes remain as inner and actual conscious habit content.

This externalization of habit and of potential mental processes results also in an externalization of social control processes. Earlier thinkers imagined mankind and individuals to be regulated in their activities by an external force, such as deity or natural law. With the development of a knowledge of the working of the human mind, but before the relation of thought to external stimuli was clearly understood, there grew up a theory that action was an unfolding of the inner nature. The Herbartians applied this theory to the field of education and the metaphysicians generally made much of it, giving to it the peculiar turn in epistemology which bears the name of Berkeley and in ethics the characterization of Kantian. In the field of social thought this viewpoint is represented by utilitarianism on its more objective side, and by philosophic anarchism in its more subjective aspects. But with the development of a knowledge of the environment and its connection with human thinking this "individualistic," or better-called subjectivistic, interpretation is giving way to a new theory of external determination of human conduct. In this case the external control is conceived of as existing in the environment, and particularly in the psycho-social environment, instead of in natural law or the supernatural. The present analysis of habit and mental content, disclosing the propensity which these processes manifest for being stored as potential categories outside of the actual neural content or organization, adds much to the content and understanding of such an external or environmental control.

This objectification and externalization of the potential habit and thought content into a phase of the environment—books, museums, newspapers, idea storage of all sorts—tend especially to objectify the social control process. It removes the immediate direction of human social affairs from the active

conscious processes and places it largely in the stored psycho-social and physico-social content. The standardized, environmentalized, objectified stored potential knowledge and habit content must play an ever-increasing rôle in social control. Of greater present power in social control is a less objectified phase of the psycho-social environment—the institutions, customs, traditions, conventions, and the like. These controls have their existence partly in human consciousness and in muscular and neural habit. But they are also partly imbedded in the externally stored potential habit and thought content. And this externalization of institutions and other abstract psycho-social controls will increase as data and technique increase in volume and as more and more of these are stored as potential action and thought material outside of the immediate grasp of the human mind.

The implication of this discussion and of the ideas developed in this and the preceding chapter must now be clear. As is shown in the diagram of the various stages of development of neuro-psychic processes or technique, the tendency is for adjustment processes operating between the organism and the environment to get farther and farther away from instinct. In the last stages of the development of such adjustment mechanisms the technique is not only of the acquired sort, operating through habit mechanisms when it actually functions, but it is in large degree externalized into the environment itself. Habit, like instinct, is a mechanism residing in the organism. But potential habit, or thought, is stored outside of the organism and does not necessarily proceed from the experience of the organism upon which it is destined to operate. It is organized first within the psycho-social or physico-social environment and is then applied to the direction of the adjustment processes of the individual organisms through being taken into their consciousness or otherwise being made to oper-

ate upon or create habit equipment. In this way the environment comes increasingly to dominate the adjustment processes at the expense of the instinctive or native equipment. Social control in a civilized society has been objectified into the newly created and expanding social environment, and the dominance of instinct is fading accordingly and proportionately. Even now the instinctive control of life obtains only in a very minor degree. Practically all of the institutions are being organized on the basis of external and objective social controls. In fact, the primary social significance of institutions is the substitution of external objective control for instinctive subjective control of conduct. We have now reached the stage of development in which science, rather than custom, plays the leading rôle in creating this objectivity of social control through institutions. The social sciences represent the extension of the scientific method into the field of human affairs as the means by which science is applied to this objective social control process. Formerly science and scientific method were developed only for the interpretation and control of the physical world.

CHAPTER VII

CURRENT USAGE OF TERM INSTINCT

There is scarcely any concept employed in the social sciences about which there is so much diversity of usage and uncertainty of meaning as there is concerning the term instinct. The social sciences are at many points lacking in a definite terminology, since they have developed out of popular interest and are still largely determined by popular opinion and usage. There is, however, a strong realization of the need of greater definiteness in the employment of the concepts out of which the literary structures of these sciences are built. This search for definiteness has not left the term instinct untouched. The discussion of this term has in recent years been considerable. McDougall's *Introduction to Social Psychology* in particular, and many other books of more recent date, represent attempts to bring order out of a chaotic field, attempts which have been only moderately successful. So numerous are the variations in the meaning of this term, as used by those discussing social relationships and origins, that it is difficult to classify them accurately. A considerable analysis of the literature dealing with social themes, however, suggests that the several fairly well-defined usages may be grouped under the following four general headings:—(1) a general and indefinite employment of the term instinct, not necessarily descriptive of a concrete act at all; (2) all cases covering automatic and habitual actions of any sort; (3) those more or less automatic stimulus-response activity processes which are supposedly inherited; and (4) acts which are definitely inherited and which may be properly termed instinc-

tive. These usages may fittingly be described under the following categories and illustrated accordingly from the numerous examples at hand.

The least scientific employment of the term instinct is that of the litterateurs. It falls into two classes, generally speaking. The first does not represent any attempt at scientific usage at all. It is merely a literary device. Instances of this literary employment of the term are to be found in such passages as "chariot instinct with spirit" (Milton) and "genius instinct with music" (Wordsworth). Although such an unscientific use of the term is usually confined to the litterateurs untrained in the scientific terminology of psychology, there are not wanting similar instances among those with some reputation in the sociological field. Benjamin Kidd has given us the following example: "We behold the whole drama of progress in life becoming instinct, as it were, with a meaning which remains continually projected beyond the content of the present." [1] Many citations of this peculiarly and psychologically almost meaningless use of the term might be collected from a multitude of sources, but the following examples will serve sufficiently to illustrate the matter: "All was instinct with the ravaged . . . sadness of a spot handed over to excavation, and where only men of learning could wax enthusiastic," [2] "instinct with contempt," [3] "Italy of yesterday . . . instinct with a dying grace," [4] "instinct with the breath of heaven," [5] "instinct with joyous life," [6] "instinct with heredity," [7] "the body-mind organism instinct with the

[1] *Principles of Western Civilization*, 53.
[2] E. Zola, *Rome*, I, 219.
[3] *Ibid.*, I, 133.
[4] *Ibid.*, I, 321.
[5] B. Pares, *Russia and Reform*, 92.
[6] G. F. Nicolai, *The Biology of War*, 443.
[7] D. Starch, *Educational Psychology*, 24.

single impulse to assert or realize actually what it is potentially," [1] "instinct with suggestion," [2] "instinct with perfume," [3] "instinct with an indescribable prestige," [4] "the Athenian world instinct with its own mission," [5] "our world instinct with its mission of industrial and political development," [6] "A treaty instinct with a different spirit," [7] instinct with the spirit of hate,[8] instinct with the spirit of the pastoral.[9] It will be observed that most of these examples are taken from rather serious works on political or social subjects. This fact shows that even this least scientific type of the employment of instinct is indulged in by the kind of writers who should be most careful about their terminology. The obvious criticism of this application of the term is that it does not make instincts synonymous with specific activities. Instincts are in reality specific adjustments, acts which can be clearly defined. They are not merely vague qualities of activity or perception, such as the examples above cited would tend to make them seem. Instincts are neurological facts, that is, definite stimulus-response processes. As such and only as such are they known to the scientist as distinguished from the litterateur and the dilettante and uncritical thinker.

A second literary and highly indefinite employment of the term is to be found in the tendency of many novelists and dramatists to speak of "his instinct" or "her instinct" to do almost any type of act towards which the characters in their books have a strong impulse or for which they have well-developed habits. Meredith speaks of "His instinct to

[1] H. J. W. Hetherington and J. H. Muirhead, *Social Purpose*, 73.
[2] Arthur Symons, *Introduction to the Study of Browning*, 60.
[3] M. Maeterlinck, *The Life of the Bee*, 304.
[4] *Ibid.*, 244.
[5] *The Nation*, 109:199.
[6] *Ibid.*
[7] *Ibid.*, 108:904.
[8] *Ibid.*, 108:313.
[9] *Ibid.*, 108:689.

act" [1] in a general sense. He also tells us that "His instinct had caught a new view from these facts." [2] Perhaps a little more definite are "His instincts, the magic slaves of love." [3] Galsworthy makes of this mysterious "his instinct" a sort of guardian genius, perhaps a good deal like Socrates' daimon, which told the canny old philosopher what to do. Galsworthy says, "His instinct told him that what the agent had said was true." [4] Again, "His instinct told him that this taciturnity was the very thing." [5]

All types of writers indulge in useless redundancies about instinct, speaking, for example, of inherited instinct [6] or instincts,[7] hereditary instinct,[8] hereditary instincts,[9] natural instinct,[10] natural instincts,[11] native instinct,[12] native instincts,[13] and the like. Also there is an apparently indiscriminate reference to fundamental instincts, infallible instincts, ineradicable instincts, fixed instincts; to primary, secondary, rudimentary, purposeless, rooted, simple, complex, strong, weak, general, special, specific, subconscious, unreasoning, senseless, irrational, crude, fancy, subtle, sane, ruthless,

[1] *Richard Feverel*, 283.
[2] *Ibid.*, 162.
[3] *Ibid.*, 211.
[4] *Man of Property*, 70.
[5] *Ibid.*, 339.
[6] A. Forel, *The Sexual Question*, 94, 198; W. Lippmann, *Preface to Politics*, 81; A. G. Tansley, *The New Psychology*, 50, etc.
[7] Tansley, *op. cit.*, 24, 260, etc.
[8] C. H. Cooley, *Human Nature and the Social Order*, 30, 160, 312, 349; Forel, *op. cit.*, 502, etc.
[9] Forel, *op. cit.*, 198, 366, etc.
[10] H. Ellis, *Affirmations*, 232, 237, *Man and Woman*, 292, *Task of Social Hygiene*, 207; D. Hume, *Human Understanding*, 433, 436, 442 (Harvard Classics); Hetherington and Muirhead, *Social Purpose*, 136; F. Nietzsche, *Thoughts Out of Season*, 90, 95; H. Ibsen, *Rosmersholm*, 78; R. Rolland, *Jean Christophe*, IV, 67, etc.
[11] Dunton, *Reconstruction Therapy*, 182, 183; Ellis, *Affirmations*, 138; Tansley, *op. cit.*, 63; W. A. White, *Mental Hygiene of Childhood*, 97, etc.
[12] Alice S. Green, *Irish Nationality*, 39; *Nation*, 109:21, etc.
[13] Ellis, *op. cit.*, 25; J. K. Hart, *Community Organization*, 195, 200, etc.

primitive, ancient, legitimate, false, loyal, lower, higher, good, bad, healthy, greater, lesser, atavistic, blind, careless, debased, deep, dim, dogged, conflicting, coöperating, elemental, evanescent, favorite, etc., instincts, almost without end or definite meaning.[1]

One of the most interesting groups of so-called instincts is that which I have listed as "Indefinite and Peculiar." These range all the way in content from mere adjective characterizations of instincts, not otherwise named, such as admirable instinct, all-dominant instincts, ancient instinct, and others listed in the preceding paragraph, to those which are more definitely localizable and characteristic, such as instinct-feelings, instinct expression, feminine instinct, animal instinct, or even "Peter the Great's instinct," [2] "Lucy's pure instinct," [3] "their (the Italians') natural instinct," [4] "an instinct multiform, yet corporate, as of a whole people in arms," [5] instinct of multiform activities,[6] purposeless instinct,[7] worn-out instinct,[8] "An instinct that one would have thought only a woman could have for women," [9] and in this passage, "Peter was himself the instinct of Russia enlightened and made conscious." [10] The *Nation* speaks of "a rooted instinct in men to admire what is better and more beautiful than themselves." [11] Equally indefinite, so far as the structural pattern

[1] For the frequency of occurrence and the number of "instincts" of this type see Chap. IX. In the immediately preceding citations no effort at completeness was made. The purpose was to show the variety of the types of writers employing the usage.

[2] B. Pares, *Russia and Reform*, 26.

[3] G. Meredith, *Richard Feverel*, 375.

[4] L. Villari, *Italian Life in Town and Country*, 62.

[5] Pares, *op. cit.*, 38.

[6] D. Starch, *Educational Psychology*, 15.

[7] G. F. Nicolai, *The Biology of War*, 8.

[8] F. Nietzsche, *Beyond Good and Evil*, 137.

[9] A. Symons, *Introduction to the Study of Browning*, 21.

[10] Pares, *op. cit.*, 26.

[11] *The Nation*, 108:986.

is concerned, is the following: "An instinct . . . insisting on the strict enforcement of this law (against vivisection)." [1] Kidd does not explain how such an instinct, having as its object a very recent practice, came into existence. Doubtless his conception of instinct would not recognize the necessity of such an explanation. G. Stanley Hall informs us that "Youth has an instinct which is wholesome for viewing moral situations as a whole," [2] but leaves us to speculate as to what it is. An "instinct which scorns a mean act" is very similar to the preceding, while "a wild instinct of justice" [3] might be considered to be slightly contradictory in meaning. Max Beerbohm tells us of a man who had an instinct to hide himself from the queen he had not died for.[4] Another writer thinks there is an instinct to be satisfied by seeing others comfortable and happy,[5] although most of us would regard this as a highly trained habit complex or acquired attitude. Another writer speaks of "the thoroughly English instinct that what a man cannot earn, or get for himself, he does not deserve." [6] The same author gives us another example equally good: "A profound instinct arms them (the English) against intelligence, which they recognize as the greatest foe to action." [7] The following example—"Instinct for picking them (scraps of thought) out at sight from a mass of rubbish" [8]—must be modern as well as rare. Certainly it is somewhat mixed.

The following examples obviously represent habits of thinking and judgment based upon much and varied experience. One of these is from Nietzsche: "The instinct which divines that truth might be attained too soon, before man has become

[1] B. Kidd, *Social Evolution*, 174.
[2] *Adolescence*, I, 351.
[3] Arthur Reade, *Finland and the Finns*, 137.
[4] *Zuleika Dobson*, 332.
[5] L. S. Hollingworth, *The Psychology of Subnormal Children*, 164.
[6] Price Collier, *England and the English*, 171.
[7] *Ibid.*, 165.
[8] Pares, *op. cit.*, 292.

strong enough, hard enough, artist enough." [1] Mark Twain and C. D. Warner are responsible for the statement that "He had the instinct to know that this was not the extrication she dreamed of, and that she must find by her own experience what her heart really wanted." [2] John Galsworthy says that "an instinct, partly constitutional, partly the result, as in thousands of his class, of the continual handling and watching of affairs, prompting him to judge conduct by results rather than by principle," [3] is largely acquired, which contradicts a basic element in the definition of instinct. Journalistic enterprise is responsible for "the primal instinct of every female creature to battle for the male she feels is hers." [4] Such examples of the misuse of the term instinct are very numerous in literature and might be multiplied many-fold.[5] It is quite evident that the supposed instincts here mentioned or described do not correspond to definite action patterns uniformly recurring in the race. They cannot be other than habit complexes, either internal or overt, or both in combination.

Among the most chaotic and least scientific of these usages is the custom of employing the term to cover almost any sort of vague or undefined psychical process or method, whether instinctive or merely habitual. Thus Münsterberg, uses the word "instinctively" apparently in the sense of "unconsciously" in the following passage: "The words of foreign origin are instinctively replaced by words of German root." [6] Ellwood expressly makes the two words identical in distinguishing conscious from unconscious coöperation: "We should

[1] *Op. cit.*, 66.
[2] *The Gilded Age*, 195.
[3] *The Man of Property*, 35.
[4] *Minneapolis Daily Journal*, May 12, 1918.
[5] For additional examples see Chap. IX.
[6] *American Patriotism*, 88–89.

be substantially correct if we defined society as any group of individuals who either unconsciously (instinctively) or consciously (reflectively) coöperate." [1] A similar use of "instinctively" occurs in a work by Keller, with regard to the acts of a state: "For Rome instinctively created for herself those bonds of empire . . . ," [2] thus attributing instinct to a state, when obviously it is possible only for individuals to have instincts. A similar peculiar use of the term instinct, attributing it to the state, occurs in the following passage from Small: "In general, the despotic state, true to its subjugating instincts, uses every means to make its original form permanent." [3] In another instance, Keller makes "instinctively" equivalent to "with conscientious consistency" in speaking of Spanish policy in America.[4] In the accompanying quotation "instinctively" seems to be equivalent to "with conviction": "Instinctively, then, there is a demand for a good heredity, bodily and mental." [5] It is difficult to ascertain whether "instinctively" is equivalent to "vaguely," "clearly," "definitely," or "unconsciously" in the following passage: "He (the physician) could not pass by the new science of mind without instinctively feeling that his medical diagnosis and therapy could be furthered in many directions by the experimental method." [6] The same may be said of the following passage also: "Instinctively they seem to have felt their needs, better education, and a stronger economic position within the empire." [7] In the three following examples "to feel instinctively" is used as equivalent to "to recognize subconsciously": ". . . he (Plato) must have had an in-

[1] *Sociology in Its Psychological Aspects*, 13–14.
[2] *Colonization*, 54.
[3] *General Sociology*, 231.
[4] *Colonization*, 257.
[5] C. A. Herter, *Biological Aspects of Human Problems*, 201.
[6] Münsterberg, *Psychology and Industrial Efficiency*, 12.
[7] W. S. Davis et al., *Roots of the War*, 171.

stinctive feeling that when the State undertook the work of match-making it would be wise for male administrators not only to consult, but also on occasion to obey, the most intelligent representatives of the class possessing hereditary aptitudes for the arts of match-making and breeding" [1] and "In a vast and complex society that which is instinctively felt to be 'actual' may in fact be very abstract"; [2] also, "Human nature might be said to feel a similiar assurance instinctively, *i. e.*, that rational justification will automatically follow upon the expression of the most purely emotional impulses." [3] In the same vague way Reinsch described the way "we instinctively look beyond the boundaries of the national state" when nations are not self-sufficing.[4] Mangold tells us that "many of the scenes presented in such shows . . . so inflame the imagination of the child that he often instinctively purposes to re-enact similar scenes," [5] and Sir George Nicholls gives us this passage: "(the king) calling upon the people to follow him as their leader, which, after a little wavering, they instinctively did." [6] Repeatedly A. V. Dicey makes instinct equivalent to feeling, emotion and sentiment, notwithstanding the fact that these may be acquired as well as inherited. For example, he says, "Here we touch upon the apotheosis of instinct. That reaction of the nineteenth against the eighteenth century, the influence whereof streamed in upon John Mill and his contemporaries, and thus deeply affected the generation which came under their teaching, was by no feature characterized more distinctly than by the new importance attached to the emotional as contrasted with the rational side of human nature. This reliance on appeal to

[1] A. W. Benn, *History of Ancient Philosophy*, 96.
[2] Graham Wallas, *The Great Society*, 347, note.
[3] Leo Perla, *What Is National Honor*, 90.
[4] *Public International Unions*, 8.
[5] *Child Problems*, 282.
[6] *History of the English Poor Law*, Vol. I, p. 53.

feeling or instinct would have appeared to Bentham," etc.[1] In the following passage from Cooley, judgment is attributed to instinct. He says that there is, for the most part instinctively, "a tendency to judge every new influence . . . by its relation to the whole achieved or in contemplation, and to call it good or ill according to whether it does or does not make for a congruous development." [2] In the following passage instinctive thinking is implied: "In a situation of genuine peril there is an instinctive tendency to think more clearly and dismiss emotion." [3] Instances of the loose use of instinct of this type might be multiplied indefinitely.[4]

Some writers have more of a penchant for this indefinite use of the term instinct or some derivative form of the term than others. A few selections from Veblen's *Theory of the Leisure Class* will serve to give some idea of the liberality of this usage. ". . . there is no question but that all well-bred people (in the Occidental civilized communities) instinctively and unaffectedly cleave to the one (the high gloss of a gentleman's hat) as a phenomenon of great beauty, and eschew the other (a similarly high gloss on a threadbare sleeve) as offensive to every sense to which it can appeal," [5] also, ". . . we instinctively insist upon at least some measure of wasteful expensiveness in all our consumption, even in the case of goods which are consumed in strict privacy and without the slightest thought of display." [6] The study of the development of a child's interest in clothing reveals the fact that this interest is acquired as a means to display. Once the habit of wearing expensive clothing has been acquired this habit remains effective in private as well as in public,

[1] *Law and Public Opinion in England*, 446. Compare also pp. 454–455 and 462.

[2] *Human Nature and the Social Order*, 124.

[3] Perla, *op. cit.*, 127.

[4] For a summary of cases of this type, see Chap. IX.

[5] *Loc. cit.*, 132.

[6] *Ibid.*, 156.

especially when a private situation is liable at any moment to be transformed into a public one because of the arrival of callers. We have here a habit rather than an instinct, although the habit may be more or less distantly based on instincts. In the following passage from Veblen [1]—"Any other than expensive material is instinctively odious to us,"—habit rather than instinct is clearly indicated; for it can scarcely be maintained that we have an instinctive capacity for recognizing expensive clothing. Even those who have had expert training in such matters are sometimes deceived. Veblen also says, "The opposition of the (leisure) class to changes in the cultural scheme is instinctive . . . it is an instinctive revulsion at any departure from the accepted way of doing and looking at things." [2] Yet among the leisure class—perhaps members of the same race, therefore, with the same instinctive equipment—in another community the accepted ways of doing things, held just as tenaciously, may be quite different. Since the revulsion against change is a function of the existing adjustment and not a thing apart from it existing in vacuo, as it were, it would seem that a learned or habit adjustment rather than instinct plays the dominating rôle. This sort of confusion of instinct or inherited tendency with acquired attitudes is equally patent in the two following quotations: ". . . with a glance of the eye we estimate instinctively the age of a "passer-by," [3] and "It is recognized that a person may unwittingly break a regulation of custom or that he may, as in the case of Uzzah, instinctively or without premeditation put forth his hand and receive a deadly shock from a sacred object." [4] Such vagueness in the use of the term instinct and its derivatives precludes any system or order in its employment and makes an intelligible defini-

[1] *Ibid.*, 169.
[2] *Ibid.*, 199.
[3] A. Keith, *Man*, 130.
[4] I. King, *The Development of Religion*, 282–3.

tion of instinct on a biological inheritance basis impossible. Although it is not infrequently thus employed by persons of eminence in the social and allied sciences, there is of course no sanction to be found in the experimental sciences of psychology and neurology for such usage.

Another employment of the term instinct recognizes its definite stimulus-response character and treats it as any automatic or habitual type of activity, whether inherited or acquired. This appears to be the second most frequent of the improper uses of instinct which are current among the social scientists and other writers, if indeed it is not the most common. Frequently writers in the social and allied sciences fail to distinguish inherited activity mechanisms from acquired habits in their descriptions of supposed instinctive processes. Examples of this sort of confusion were included in a preceding paragraph. Other examples are easily cited, as for instance the following passage from Warner's *American Charities:* "Intermittently from the first, the altruistic instinct seems to have been reënforced, or its acts counterfeited, by egoistic instincts, originating in educational, or political, or religious considerations." [1] It would appear from this passage that its author believes that instincts may be acquired through experience. A similar assumption is implicit in the writings of the biologist Conn, who has ventured into the interpretation of social phenomena. While he speaks of instinct as the expression of inherited structure,[2] a few pages further on is to be found the following passage: "These examples show that such individuals acquire not only the customs and habits but also the methods of thinking, and even the moral instincts of the human beings with whom they have been in contact during their early years." [3] In another passage this writer shows very

[1] *Loc. cit.*, 4. [2] H. W. Conn, *Social Heredity and Social Evolution*, 282–3.
[3] *Ibid.*, 285.

clearly that he does not distinguish between instinct as an inherited activity and acquired habit. He says, "Thus, in the human race, as well as in animals, it is the instinctive side of the nature which frequently controls our actions. After our habits are once formed, we follow them unthinkingly for the rest of our lives." [1] Another member of the biological fraternity speaks of a "careeristina instinct," which he says is "the fruit of the practice of so many generations" that it cannot be uprooted "by the good intentions of a mere statesman." [2] A neurologist thinks it will be possible, "by careful supervision of industry and by giving intelligent assistance to those applying for positions . . . to reduce the number of persons who develop antisocial instincts as the result of occupying positions in which it is impossible for them to experience any sense of achievement or satisfaction in the performance of their daily tasks." [3] Münsterberg, in speaking of the difficulties of professional reporters, complains that the externally imposed requirements of their vocation "train in them instincts which are sapping their finest impulses." [4] According to Münsterberg and Conn, therefore, instincts can be produced as the result of training. Another writer offers a "list of instincts peculiarly developed by play." [5] Professor Hayes falls into the same error in speaking of Utopias: "Herein also lies the main obstacle to the various social Utopias, which require a subordination not only of individual interests, but also of class interests, to common principles to which the instinctive morality developed by personal groups is not only inadequate, but to which it is often antagonistic." [6] A like conception of instinct as embodying acquired habit is displayed in the defense

[1] *Ibid.*, 216–217.
[2] Louis Berman, *The Glands Regulating Personality*, 8.
[3] Stewart Paton, *Human Behavior*, 444–5.
[4] *American Patriotism*, 30.
[5] Walter Wood, *Children's Play and Its Place in Education*, 196.
[6] E. C. Hayes, *Introduction to the Study of Sociology*, 77–78.

of a New York City school teacher to the charge that he had been disloyal. His defense runs, " . . . that the said——— considers it not to be his duty to develop in the students under his control instinctive respect for the President of the United States as such, the Governor of the State of New York as such and other Federal, State and Municipal officers as such." [1] Another example of newspaper use of the term instinct with a similar confusion of meaning occurs in the following: "Those German soldiers have still in their blood the military discipline taught to their forefathers by Frederick the Great, and they go to slaughter without wincing." [2]

Another phase of the indefinite usage regarding instinct—one in which the mechanism is regarded as inherited, although the term is used very loosely—may be illustrated by the theories of Hocking.[3] He speaks of specific and general instincts. The former are apparently relatively definite inherited stimulus-response processes,[4] although even they probably require some education to cause them to function completely in any particular situation.[5] The general instincts, however, are those in which "both the end and the process are to be described in general rather than specific terms." [6] He cites fear as an example. It "expresses itself not alone in flight but in contraction, concealment, rigidity, etc. Yet it also has a definable end; and its unity seems further guaranteed by its genetic position at the head of a group of defensive reactions. I should recognize fear as the (rather inaccurate) name of an instinct of still higher generality." [7] Again, in further elucidation of this viewpoint, he says, "I should . . . be inclined to group

[1] Reported in the daily press, New York City, Nov., 1917.
[2] *The Minneapolis Journal*, April 18, 1918.
[3] *Human Nature and Its Remaking*, part II.
[4] *Ibid.*, ch. 9, and p. 115.
[5] *Ibid.*, 151.
[6] *Ibid.*, 53.
[7] *Ibid.*

all the assertive and outgoing instincts under one highly general instinct of activity, or expansion, and all the negative instincts under a highly general instinct of aversion or fear. Pugnacity would be a general instinct, comparatively late in development, uniting in itself the qualities of aversion and expansion." [1] Thus we see that the general instincts are really, in many cases at least, syntheses or combinations of the simpler and more specific ones.[2] But, unfortunately, as the last quotation shows, this synthesis often becomes a synthesis of qualities or values, instead of a synthesis of processes or action patterns. Because of this fact, his general instinct is frequently nothing more than an anthropomorphic valuation of activity processes, or, at best, a habit complex organized under the direction of these anthropomorphic valuations.

Hocking recognizes the difficulty of getting a structural unity, as well as a moral or human value unity, out of these general instincts. Speaking of curiosity, he says, "Yet if we ask what we should regard as the 'stimulus' in the case of curiosity, we find it impossible to bring it under the usual reflex scheme." [3] He quotes McDougall to the effect that "there is no one class of objects to which it is especially directed, or in the presence of which it is invariably displayed." [4] He continues: "And if we ask what we should regard as the 'response,' we find a similar difficulty. Curiosity has its manifestations in physical behavior like any other instinct; but the behavior is now of one kind and now of another, —listening, peeking, testing with hands and mouth, pulling apart, smelling, shaking, tiptoeing and creeping up upon, or later, reading, asking questions, 'stopping to think,'— there is no one-to-one correspondence between the impulse of curiosity and any type of physical action." [5] He rejects

[1] *Ibid.*, 54.
[2] *Ibid.*, 51.
[3] *Ibid.*, 62.
[4] *Ibid.*
[5] *Ibid.*, 62–3.

the easy solution—too easy in most cases—of the difficulty involved here, which holds that such an instinct as curiosity is merely the general name for multiple combinations of "a multitude of fragmentary instincts." He also rejects McDougall's hypothesis of the unchangeable central process,[1] which holds "that we are dealing with a purely psychical process which has no complete physiological expression." [2] His solution, as finally suggested, would not be disputed by the environmentalist. It would give due recognition to the fact that many of the activities included in the responses to curiosity above enumerated are of an acquired nature. Because of the acquired character of many of the responses the "multitude of fragmentary instincts" theory would not hold. McDougall's hypothesis would not be disturbed by the acquired nature of stimuli or responses, but McDougall's unchangeable central segment theory does not square with the facts of neurology.[3]

Hocking's contention is "that we must recognize a kind of process in which the 'stimulus' as well as the 'response' are primarily central. It is the existing state of consciousness which determines whether, and in what quarter, curiosity shall be aroused, and what constitutes its satisfaction. In physiological terms, curiosity is a function of the condition of the centers." [4] This may be granted; is, in fact, urged by those who deny that there are such general instincts as those claimed by the author. Consciousness does determine the stimulus and the response in all complex acquired activity processes, at least until they have become automatic, or unless they have been organized subconsciously. But the content of consciousness is not instinctive and unless it is instinctive the activity organizations which it determines

[1] McDougall, *An Introduction to Social Psychology*, ch. 2.
[2] Hocking, *op. cit.*, 63.
[3] See C. J. Herrick, *An Introduction to Neurology*, chs. XIX–XXI.
[4] Hocking, *op. cit.*, 63.

or which eventuate as the corresponding overt manifestations of it cannot be spoken of as instinctive.

His next statement, although intended to corroborate the above explanation and lead over to and clinch the final argument for the unitary and real character of the "general instincts," actually has no necessary connection with what precedes. He says, "It seems probable that there is a group of such (central) tendencies, quite as native as any modes of muscular behavior. If certain central conditions are natively unsatisfactory and certain others natively satisfactory (which can hardly be doubted), it is a question of organization whether there will also be native ways of bringing about a change from the former to the latter of these conditions. Whether we extend the word instinct to them, in view of their deviation from the primary pattern, is a matter of choice in definition. They might well be distinguished as 'central instincts,'" because they depend not upon specific routings of nervous energy, but on the nature of the nervous system itself.[1] The difficulty with this last passage is that it ignores the fact that all activity processes *must* depend on specific routings or connections in the nervous system. This is as true in conscious or acquired central control as of purely instinctive control of responses. All action has its central neural organization as well as its peripheral or muscular and glandular response aspects. If this central organization is inherited, we *may* call the activity process instinctive; if it is acquired, we *must* call the action pattern habitual. Where consciousness directs the response we may be sure that the action pattern is not inherited but is acquired. If the central "conditions," as Hocking calls this neural organization, are inherited, we have instincts like any other instincts, and there is no point to calling them "central instincts." All instincts are central in the sense that they have central "conditions" or organization,

[1] *Ibid.*

however simple or however complex they may be. Hence, this avenue out of the difficulty imposed by the discreteness of the stimuli and the responses of the "general" instincts is a blind alley and the sooner it is abandoned and closed at the entrance the better it will be for clear thinking. Hocking is simply attempting to do what so many others, uncritically influenced by the biological viewpoint, have attempted—to make instincts out of habit complexes.

The author proceeds a step further in advance. This line of reasoning justifies him, he seems to think, in legitimizing the now defunct general "instincts" of self-preservation and self-assertion. These are central to the personality, hence to the will. He says, "Will exists when, and in so far as, any instinctive impulse has first to obtain the consent of a ruling policy before pursuing its course. The policy of a self is its acquired interpretation of its own central and necessary interest. And thus, if men are alike in nature, we should be able to perceive at the center of all 'central instincts' and 'necessary interests,' and indeed within all instincts whatever, a nucleus of common meaning which we would be justified in calling the fundamental instinct of man, the substance of the human will." [1] This he calls the will to power. By this process of generalization of instincts into a general will to power the author has generalized away from all concrete unity of structure or mechanism, which is essential to an instinct, and has only the unity of value or abstract concept left. There can be no form of action which corresponds to the "will to power." It is as multiform and as elusive in structure as the conditions of life themselves. By this process the author has reduced instinct to an abstraction; and instinct can only be a concrete structural reality. He has passed out of the realms of the biological and the inherited into those of consciousness and habit. Some light may be thrown upon the

[1] *Ibid.*, 71–2. See also pp. 74, 75, 147.

ease and relative unconcern with which he has done this if we examine his definition of habit. He says, "A habit might indeed be fairly described as an acquired (and usually comparatively specific) instinct." [1]

This extended analysis of the views regarding instinct sponsored by Hocking has been undertaken because they are typical. If Hocking has met his difficulties more squarely and has attempted to find a way out, while other writers have ignored or been ignorant of such problems, it only makes our illustration all the better. This confusion of habit or value complex with instinct is one of the most common facts of the day in social psychology and educational psychology, as well as in more general fields of writing. Its origins go far back into history, but McDougall probably is more responsible than any other one person for giving it a sort of respectability based on the reverence or awe which everyone has for a logical classification and a fairly definite application of principles to problems. This chapter must content itself primarily with an exposition of the usage. Another chapter will undertake to criticize it in greater detail.

Nowhere has there been more confusion and difference of opinions regarding instinct than in the various attempts at making a list of the genuinely tested instincts, viewed from the standpoint of a strictly scientific classification. These lists vary all the way from one or two major or dominating instincts to a score or more of supposed instincts, and in the treatment of Thorndike [2] there is an indefinite number. Those philosophers or propagandists who have a unilateral explanation of society or who offer some universal panacea usually limit the number of instincts pretty closely. They conceive of practically all impulses as arising from a few native springs of conduct. Sometimes this source is the property or posses-

[1] *Ibid.*, 153–4.

[2] *The Original Nature of Man.*

sive or acquisitive "instinct." [1] At other times it is the instinct of constructiveness.[2] In other cases still the instincts of play,[3] of nutrition,[4] of sex,[5] or of the herd.[6] The psychoanalysts are, at the present time, conspicuous among those who narrow the instincts most decidedly. Freud recognizes two fundamental instincts or groups of instincts, the sexual and the ego or self-preservative.[7] As subsidiary to these, however, he mentions hunger, thirst, life-preservative instinct, and the instincts to eat, to watch and to mastery.[8] A. A. Brill says, "Everything in life may be reduced to two fundamental instincts: hunger and love; they are the supreme rulers of the world." [9] Jung makes use of the nutritional, sexual and herd instincts as primary,[10] and speaks incidentally of the egoistic, altruistic, animal and art groups of instincts in addition.[11] He also mentions a religious instinct [12] and an instinct of self-preservation.[13] Jelliffe adopts the "instincts" of reproduction and self-preservation as the basic ones,[14] but accepts from McDougall [15] and Shand [16] the following subsidiary instincts: fear, repulsion, pugnacity, curiosity, self-abasement, self-assertion, tenderness, reproduction, gregariousness, acquisitiveness, hunger,

[1] For an interesting and sensible refutation of this instinct by an instinctivist see F. W. Taussig, *Inventors and Money-Makers*, especially ch. 3.

[2] T. B. Veblen, *The Instinct of Workmanship*.

[3] Karl Groos, *The Play of Man*, 1.

[4] C. G. Jung, *Psychology of the Unconscious*, 148–9, 160–1, finds that nutrition is the original instinct.

[5] S. Freud, *A General Introduction to Psychoanalysis*, 356 ff.

[6] W. Trotter, *Instincts of the Herd in Peace and War*.

[7] *Op. cit.*, 356 ff.

[8] See the writer's "Instinct and the Psychoanalysts," *Journal of Abnormal Psychology and Social Psychology*, Jan.–Mar., 1923.

[9] *Fundamental Conceptions of Psychoanalysis*, 32.

[10] *Op. cit.*, 146, 148–9, 160; also *Analytical Psychology*, 231.

[11] *Analytical Psychology*, 160, 231; *Psychology of the Unconscious*, 145.

[12] *Psychology of the Unconscious*, 71.

[13] *Ibid.*, 145.

[14] S. E. Jelliffe, *Technique of Psychoanalysis*, 66.

[15] *Introduction to Social Psychology*.

[16] *Foundations of Character*.

sympathy, suggestion, play and imitation.[1] A. G. Tansley speaks of "three great fundamental instincts," [2] but he also accepts McDougall's twelve [3] as simple instincts subsidiary to these.[4] Among the endocrinologists Bandler adopts McDougall's list and explains it.[5] He, like many other writers, makes little use of the instincts; but since it is now the fashion to have instincts in order to appear more systematic or scientific each writer on human behavior borrows for himself a set of instincts from some convenient handbook.

For ten or a dozen years after 1908, William McDougall's *Introduction to Social Psychology* was the convenient storehouse from which most writers on education, ethics, industry, sociology or social psychology drew their supplies. McDougall is sure of only seven full-fledged instincts: flight, repulsion, curiosity, pugnacity, self-abasement, self-assertion, and the parental instinct. To these he adds as more doubtful cases, reproduction, gregariousness, acquisition, construction and some innate complex tendencies like emulation, suggestion, imitation and play.[6] J. B. Watson has with considerable misgivings, made a tentative list as follows:[7]

Acquisition and possession
Hunting
Collecting and hoarding
Habitation
Manipulation
Imitation
Greed
Kindliness

[1] *Loc. cit.*, 67.
[2] *The New Psychology*, 177. These are the sex, ego and herd instincts.
[3] *Loc. cit.*, 180.
[4] *Loc. cit.*, 180–3.
[5] S. W. Bandler, *The Endocrines*, 232–8.
[6] *Loc. cit.*, ch. 3.
[7] *Psychology from the Standpoint of a Behaviorist*, 254–61.

Teasing
Migration
Fighting
Maternal instinct
Gregariousness
Tormenting
Bullying
Cleanliness
Adornment
Play

Those below the line are submitted as highly doubtful. S. S. Colvin makes up a list, in the approximate order of their development, as follows: [1]

Fear
Anger
Sympathy
Affection
Play
Imitation
Curiosity
Acquisitiveness
Constructiveness
Self-assertion (leadership)
Self-abasement
Rivalry
Envy
Jealousy
Pugnacity
Clannishness
Hunting
Predation
Migration
Love of adventure and the unknown
Superstition
Sex instincts
  Sex-love
  Vanity
  Coquetry
  Modesty
Love of nature
Love of solitude
Æsthetic } emotions
Religious }
Moral }

It is interesting and informing to observe the differences in details of content among these various classifications. William James, following Preyer and Schneider in the main,[2] has a longer list still: [3]

[1] *The Learning Process*, 35. [2] According to J. B. Watson, *op. cit.*, 254.
[3] *Psychology*, II, 403 ff.

Sucking
Biting
Chewing
Grinding the teeth
Licking
Grimacing
Spitting out
Clasping
  with fingers [1]
  with toes [1]
Pointing at desired objects
Making sounds indicating desires
Carrying to the mouth
Crying
Smiling
Protruding the lips
Turning the head aside
Holding the head erect
Sitting up
Standing
Locomotion [2]
Play
Curiosity
Sociability
Shyness
Secretiveness
Cleanliness
Pressing downward on feet
Climbing
Vocalization
Imitation
Emulation or rivalry
Pugnacity
  Anger
  Resentment
Sympathy
Hunting
Fear
Fear of strange men or animals,
  Black things
  Dark places
  High places
  Agrophobia
Appropriation
Acquisitiveness
  Kleptomania
Constructiveness

Modesty
Shame
Love (sexual)
Anti-sexual instinct
Jealousy
Parental love

Thorndike mentions many more unlearned or instinctive tendencies than James. Under the three headings of reflexes, instincts and inborn capacities,—all three categories being of

[1] Although the same word (clasping) governs these two types of clasping, an instinct is a matter of structure fundamentally, and since the fingers and the toes necessarily use different neural structures in the clasping act, there must be at lease two instincts instead of one included under this general heading of "clasping."

[2] Also divisible into more than one type, depending upon the differences in the neural structures used.

the same essential quality but differing in degree of generality [1]—he discusses or mentions literally scores of instinctive actions. They are far too numerous to list here.[2] On the other hand Meyer lists only eight instincts or original forms of behavior, as follows:[3]

1. Locomotion in a straight line in response to lack of food.
2. Turning the body axis sidewise in response to an obstacle.
3. Positive localization in its two forms.
4. Negative localization.
5. Grasping.
6. Adjustment of the sense organs.
7. Signaling.
8. Sleeping.

These various forms of behavior, which are sometimes quite complex, he analyzes and describes in detail. Certain so-called instincts he disposes of by resolving them into one or more of the above behavior forms. Thus the "instinct of hunting" he finds to be a habit based essentially upon (1) and (2), with some contributions from (3) and (5).[4] Acquisition and hoarding seem to be habits based on (3) and (5).[5] Manipulation and construction have the same bases.[5] Fear, in the form of running away, is based on (4), negative localization.[5] Attention is founded on (6) and (3),[6] sociality on (7)[6] and idleness on (8).[6]

It may be observed that there is a fundamental, although not an absolute, difference between the last two and the preceding lists of instincts.[7] In the main, the instincts in the ear-

[1] *The Original Nature of Man*, 5 ff.
[2] For a partial list of Thorndike's instincts see ch. 16.
[3] Max F. Meyer, *Psychology of the Other One*, 210 ff.
[4] *Ibid.*, 210–11.
[5] *Ibid.*, 211.
[6] *Ibid.*, 212.
[7] No attempt has been made to offer an exhaustive review of lists of instincts. Only typical examples have been sought after and reproduced here. The reader

lier lists have been general or source categories and valuations of action, while those mentioned by Thorndike and Meyer may be considered as specific or structural material out of which habits, the dominant content of everyday action, may be built. The one class represents the synthetic categories, the other the structural materials, in the main. Thorndike in particular is seeking constantly to reduce native activity processes to their lowest or simplest forms and thus to lay bare the structural materials out of which habits in action, the acquired adjustments of man, are to be built. Meyer is attempting to do the same thing, but his list consists of class or group terms rather than of specific unitary processes. Perhaps if he resolved these group terms into their constituent reflexes [some of them, such as (2) and (5) and possibly (8) are already so reduced], he would probably get down closer to the raw materials of habits in much the same way as Thorndike does. The "instincts" of the other lists also doubtless in some degree represent attempts to get down to basic or ultimate inherited action patterns. But quite obviously they are general categories of activity complexes, not composed exclusively of native or inherited processes. They are rather indiscriminate mixtures of inherited reflexes, or chains of reflexes, and habits. The further we go back in the lists towards those who have one or two or three dominant "instincts," often with subsidiary or minor ones, which are frequently themselves mixed habit and instinct complexes, do we find this composite character of the processes obtaining, with little or no discrimination as to the inherited and the acquired elements in the content.

The tendency at the present time is to break up these general or composite complexes and to separate the habit and the inherited or instinctive content. It is only by doing this that

---

will find other lists in the chapter on the classification of instincts, or in the standard text-books which are familiar to everyone.

it will be possible to use the activity categories or elements most effectively and with a minimum of confusion. In this connection both Meyer and Thorndike, without producing final structural categories and results, have rendered good service.

CHAPTER VIII

THE CLASSIFICATION OF INSTINCTS

Thorndike lists four methods of classifying instincts which are now in use. These are:

"By the functions which the tendencies perform.
By the responses which are their end-terms.
By the situations which are their first-terms.
By their origin or affinities in development." [1]

He maintains that the classifications by function are the commonest, and they have the advantage that it is easy to describe the instinct in an easily recognizable manner in this way. Most people think in this "functional" way, or in terms of results. The difficulty of this method is that it describes our attitude toward the activity process or our understanding of its value in society, rather than the process itself. Such a definition does not enable us to distinguish one instinct or set of instincts from another, so far as origin or structure is concerned, and hence does not enable us to control instincts in the character-forming process or in the process of social organization. The functional classification does not function very well in the problem of social control. The classifications of the psychoanalysts referred to in the preceding chapter, dividing the instincts into reproductive, nutritional and social or herd instincts are of this type. They describe the function performed or the social and individual value of the act rather than the process itself. This makes possible an unlimited confusion by which acts of the most diverse character are classed under the same instinct term merely because

[1] E. L. Thorndike, *The Original Nature of Man*, 205.

they serve the same function or have the same value in the life process or in the struggle for existence and survival.

Classification by responses or end-terms of the act is also a favorite one. Such instincts and reflexes as crying, smiling, coughing, sneezing, yawning, come under this category. The advantage of such a classification is obvious. It is easy to visualize such acts. They are usually clear cut and distinct; there is little chance for confusion so far as the overt aspect of the instinct is concerned. And there must be a fairly close connection between the neural organization or inner process and the overt act which gives the name to the instinct. But there is a real danger of confusion here. In the first place, a great variety of stimuli may produce the same overt result. Thorndike quotes Borgquist to the effect that there are at least forty-seven groups of causes for crying.[1] Evidently, then, there must be at least an equal number of distinct psycho-physical processes which we may call by the name of the same instinct, if crying is truly instinctive. Such a method of defining instinct ignores the inner or neural complement or aspect of the inherited process; and this is unquestionably the more important aspect, since it is the part—the connecting part—which is inherited. The overt part of the act is primarily determined by the neural organization. It is also in part determined by the gross external organization of the body and by the impact or pressures of the environment upon the responding mechanisms and the organism as a whole. But these external factors also are not included or taken account of in this method of classification and definition.

The same criticism in general may be brought with respect to the third method of classification, that by the situations which are the first terms. This method, like the first, is an external method. It does not define the psycho-phsyical mechanism involved. It takes account only of the situations which

[1] *Ibid.*, 208.

produce the result. These may vary greatly and yet, especially where habit modifications enter, produce essentially the same responses. Nor is it possible to determine accurately from these external situations what internal processes or mechanisms will be involved. There is no direct or definite correspondence between external situation and internal neural mechanism. This is because the external situation as a whole does not operate as a unit upon the neural processes. Different parts of the external situation, giving rise to the activity complex, may call into operation conflicting neural processes which prevent unitary simple responses altogether, or at least vary these responses so greatly that it is difficult to classify action accurately on the basis of the stimulus correlates. Thorndike himself points out that no one has made a classification of the instincts on this basis, although he thinks G. Stanley Hall had something like this in mind in some of his studies.[1] Such a classification is probably physically impossible, for the reason that every situation has infinite chances for variation, according as the relationship between organism and situation changes. Every change of temperature, light, distance, humidity and possibly scores of other factors in the environment would modify the situation until its measurement would become impossible because of its infinite variety. Even if the situation could be measured or kept constant it would fail to meet the requirements fully, because the situation is external to the neural process or organization which is central to the instinct. An instinct is an activity process based on a neural mechanism. The mere mention of instincts of this type—such as temperature, light, sound, food, humidity instincts—discloses the indefiniteness of the category and the impossibility of making a definition

[1] *Ibid.*, 206. Jordan and Kellogg might appear to be using this method of classification when they adopt as one major term in their classification the category of "environmental instincts," but in reality the instincts classified under this heading are of the functional type.—See *Animal Life*, 248.

in mechanical or quantitative terms. The only characterization possible, without entering into the most minute details, thereby differentiating an infinite number of instincts and transferring the description from the purely external to include also the internal or neural aspects, must remain merely qualitative. And science cannot be founded on qualitative distinctions alone.

The fourth method of classification of instincts—by "affinities in the development of the race," or by origin and descent—is the one by which Thorndike sets most store. He says, "Such a classification would be a 'scientific' or 'natural' one because it would arrange man's instincts and capacities for purposes of study in an order corresponding to their genesis in the real world, and so incite students to note the elements in which heredity carries along man's equipment and the possibilities for its future evolution." [1] We must agree with Thorndike that such a classification is conceivable. It has been attempted by Colvin in the list of instincts presented in the previous chapter, with what degree of success no two people are likely to agree. Such a classification would also have its value, for such a purpose as Thorndike mentions. The other classifications also have their values. Each classification enables us to make a grouping, and consequently a selection, of action patterns according to some category which we may desire to manipulate or control. In one case it is the use to which we may put the action patterns, that is, the socially desirable ends which we may wish to achieve. In another case the attention is thrown upon the responses which may be decidedly significant in the social control process. In a third case it is the type of situation, or the immediate environment, which may condition the forms of activity; and no one will deny the importance of environmental analysis any more than he will question the significance of ends or social values.

[1] *Ibid.*, 208.

But no one of these points of emphasis tells us anything definite and final about the nature of the instinct itself. It does not enable us to recognize, to distinguish and to measure, the instinct. It leaves us where we may still confuse one instinct with another because we have classified the instinct in each case in terms of its service or its external connections or its origins and relationships. Such classifications are valuable, but they are only partial or supplementary. They are not final and they cannot stand alone.

We must add to these categories listed by Thorndike a fifth type of classification, one based on inner structure and organization. This is of course an extremely difficult classification to make, because the process of localization of instincts has only begun.[1] The ideal method in making such a classification would consist of at least two parts: (1) the tracing of the neural pathway of each instinctive activity process, and (2) the classification of these various neuropsychical inherited processes according to the organic connections which they serve,—whether purely internal, as in the case of digestive and assimilative processes, circulation, etc.; or of a mixed inner and outer adjustment character, as in respiration, perspiration, etc.; or, finally where the stimulus and response are both primarily external, as in the case of withdrawing from a heated object or from a cutting or tearing surface or the stimulus of light, heat, etc. Only by means of such a classification will we be able adequately to distinguish one instinct from another and thus to classify the instincts according to their individual and collective identity, as well as from the standpoint of their use, origins and external associations. Already we know enough about the nervous system to locate and classify many of the instinct mechanisms according to the second subdivision of this fifth category. We

[1] R. C. Woodworth, *Psychology*, 293.

can locate those connected with movements of the eye, tongue, heart-beat, respiration and a host of others of similar functional types. But we have not yet learned to trace the actual neural processes or fibers which connect sense organs with muscular or glandular mechanisms. This will come in time, although slowly, largely as the result of experimentation upon lower animals. The knowledge basic to this fifth type of classification will be invaluable, not only because it will enable us to distinguish between inherited and acquired processes, but it will also make it possible to judge from the positions in the nervous system of the instinctive processes the relative degree of educability under the control of the cerebral cortex. It may conceivably, some time in the future, enable the scientist to exercise some sort of taxinomic control over the educative process through the agency of surgery or vascular, muscular or glandular, control processes, or even by the use of drugs and other chemical and physical applications and appliances. But such results certainly are not now feasible, except possibly in the crudest and most general sort of way. Such a classification, based on the inner organization or structure of the instincts, is not possible without taking into account the end organs and the muscular and glandular response mechanisms. But an efficient classification cannot be based on these external factors alone. For the best working results in applied behavior, whether in education, psychotherapy, or any other field, including that of general social practice, all five classifications must be used together to supplement each other. But the classification on the basis of inner structure and organization must ever be basic and central to the other four. The fact that it arose last is not significant of its relative importance, but only of the difficulty encountered in the process of definition and segregation or differentiation. Definitions dependent upon internal analysis are most difficult to make.

With this preliminary analysis of the bases or methods of classification of instincts to serve as a point of departure for criticism and comparison, we may now consider a number of typical classifications of instincts set forth by writers whose books are now current. In addition to the classification on the basis of genesis, cited above, Colvin offers two other classifications: (2) Egoistic, altruistic and mixed instincts; [1] (3) Personal and impersonal instincts.[1] The former of these two additional classifications is a very common one, to be met in some form in a great variety of books. It, also, belongs to the first of Thorndike's classification types. The second of the two classifications is not so commonly seen. It is difficult to classify it according to Thorndike's categories, but it probably belongs to the third. Another classification of the first of Thorndike's types is offered by Colvin and Bagley,[2] as follows:

I. Adaptive instincts
- Acquisitiveness
- Imitation
- Repetition
- Play
- Inquisitiveness or curiosity
- Constructiveness
- Migration

II. Individualistic instincts
1. Self-protective
   - Combative
   - Retractive
     - Shrinking
     - Flight
   - Repulsive
2. Self-assertive
   - Self-assertion

[1] S. S. Colvin, *The Learning Process*, 36.

[2] *Human Behavior*, 137–8

3. Anti-social
   Teasing
   Bullying
   Predatory
   Shyness

III. Sex and parental instincts
   Protection of the young

IV. Social instincts
   Rivalry
   Gregarious
   Coöperative
   Altruistic

V. Religious and æsthetic
   Religious—self-subjugation
   Æsthetic—rhythm

It is not difficult to see how the terms in the foregoing classifications overlap, because the distinctions are not made in terms of structure but on the basis of the social values or functions which each so-called instinct serves. The "instincts" in this classification are not instincts at all, so far as any structural or organization definition is concerned. They are merely activity and abstract value complexes, in which no method or power of distinction between acquired and inherited elements inheres within the classification itself. The emphasis is upon the social value of the action, not upon its derivation and distinctness. The same sort of a mechanism, or identically the same mechanism, might easily be included under several or even all of these so-called instincts defined and classified according to function or value. Such an eventuality would in itself condemn the above grouping as violating the first condition of scientific classification, that of separateness of the terms. The same may be said in general ,of the following classification by Kirkpatrick,[1] which Thorndike quotes

[1] E. A. Kirkpatrick, *Fundamentals of Child Study*, ch. 4.

and characterizes as being one of the best of the first type.[1]

I. Individualistic or self-preservative instincts
    Feeding
    Fearing
    Fighting
II. Parental instincts
    Sex and courtship instincts
    Singing
    Self-exhibition
    Fighting for mates
    Nest building
III. Group or social instincts
    To arrange themselves in groups
    To coöperate for the common good in attack and defense
    Seeking companionship
    Desiring the approval of the group which one joins
    Pride
    Ambition
    Rivalry
    Jealousy
    Embarrassment
    Shame
IV. Adaptive instincts
    Tendency to spontaneous movement
    Tendency for nervous energy to take the same course that has just been taken
    Tendency to imitation
    Tendency to play
    Tendency to curiosity
V. Regulative instincts
    The moral tendency to conform to law
    The religious tendency to regard a higher power

[1] *Op. cit.*, 205.

VI. Resultant and miscellaneous instincts and feelings
- The tendency to collect objects of various kinds and to enjoy their ownership
- The tendency to construct or destroy and the pleasure of being a power or a cause
- The tendency to express mental states to others of the species and to take pleasure in such expression
- The tendency to adornment, and the making of beautiful things, and the æsthetic pleasure of contemplating such objects.

Besides including a number of activity or adjustment values, such as imitation, play and curiosity, which are not now regarded by the conventional psychologists as instinctive, we find in this classification obvious signs of overlapping, for the same reasons that operated in the preceding classification. Fighting for mates, for example, would probably make use of the same neuro-muscular mechanisms as fighting for self-preservation, yet they are classified as separate instincts. Again, self-exhibition might easily use the same neuro-muscular or neuro-glandular processes as ambition, and ambition as pride. Seeking companionship might employ the same organic processes as courtship, at least in part. If such is the case, obviously this classification is not very significant. It needs to be corrected by the use of a classification on the basis of inner mechanism and organization. This classification illustrates again the impossibility of distinguishing instincts on the basis of their use. Instincts cannot be defined in such terms; they can only be characterized and evaluated socially in this way. Also, all of the instances of instincts listed under classes V and VI are obviously largely learned in character. They are habit complexes rather than instincts; but the functional basis of classification does not make it possible to detect such a confusion.

Two other classifications of instincts, carefully made, but of the same general character, may be cited. They serve not only to illustrate the confusion set forth above; but they also suffice to show how differently two or more distinct persons may see the meaning or significance of the same facts when they are employing speculative subjective, instead of quantitative objective, criteria of measurement. The former of these two classifications is by Howard C. Warren [1] and is as follows:

I. Nutritive instincts
  - Metabolic expressions
  - Walking
  - Feeding
  - Wandering (hunting)
  - Acquiring (hoarding)
  - Cleanliness

II. Reproductive instincts
  - Mating (sexual attraction, courtship)
  - Maternal
  - Filial (of infancy)

III. Defensive instincts
  - Flight
  - Subjection
  - Hiding
  - Avoiding
  - Modesty (shyness)
  - Clothing (covering)
  - Constructing (home-making)

IV. Aggressive instincts
  - Fighting
  - Resenting
  - Domineering
  - Rivalry

[1] *Human Psychology*, 106.

V. Social instincts
- Family (parental, filial)
- Tribal (gregarious)
- "Apopathetic"
- Sympathetic
- Antipathetic
- Coöperative

To these so-called instincts or classes of instincts may be added certain reputed instinctive tendencies of man.[1]

- Imitativeness
- Playfulness
- Curiosity
- Dextrality (right-handedness)
- Æsthetic expression
- Communicativeness

The best that can be said of the so-called instincts under the general headings of this classification is that they also are composite categories, including many different specific instincts and reflexes as well as habits.

Woodworth offers a classification which cuts across Warren's and only partly coincides with it. It runs as follows:[2]

I. Responses to organic needs
- Drinking instinct
- Hunger instincts
  - Sucking
  - Swallowing
  - Chewing
  - Seeking the breast
  - Rejecting the breast
  - Spitting out bad-tasting food

[1] *Ibid.*, 107. For a list of reflexes see p. 100.

[2] *Op. cit.*, 138–169.

- Hunting
  - Crouching
  - Stalking
  - Springing
  - Teasing
- Food-storing

Breathing and air-getting instincts
- Air-hunting
- Waste-elimination

Responses to heat and cold
- Sweating
- Flushing of skin
- Paling of skin
- Shivering
- Shrinking from heat
- Shrinking from cold

Shrinking from injury
- Flexion reflex
- Winking
- Scratching
- Rubbing the skin
- Coughing
- Sneezing
- Clearing the throat
- Wincing
- Limping
- Squirming
- Changing from an uncomfortable position
- Flight
- Cowering
- Shrinking
- Dodging
- Warding off a blow
- Huddling into the smallest possible space
- Getting under cover
- Clinging to another person

Crying

- Fatigue
- Rest
- Sleep

II. Responses to other persons
- Herd instinct or gregarious instinct
  - Uneasiness when alone
  - Seeking company
  - Remaining in company
  - Following
- Mating instinct
  - Strutting
  - Decoration of the person
  - Demonstrating one's prowess
  - Admiring attention to one of opposite sex
- Parental or mothering instinct
  - Feeding the young
  - Warming the young
  - Defending the young

III. Play instincts
- Playful activity
  - Kicking by baby
  - Throwing arms about
- Locomotion
  - Walking
    - Holding up the head
    - Sitting up
    - Kicking with an alternate motion of the two legs
    - Creeping
  - Climbing (?)
- Vocalization
  - Crying
  - Cheerful babbling
- Manipulation (by baby)
  - Turning things about
  - Pulling things
  - Pushing things
  - Dropping things

- Throwing things
- Pounding things

Exploration or curiosity

- Examination of objects by the hand
- Examination of objects by the mouth
- Listening to a suden noise
- Following a moving light with the eyes
- Fixing the eyes upon a bright object
- Exploring object visually by looking successively at different parts of it
- Sniffing an odor
- Asking questions
- Attention (?)
- Reasoning (?)

Tendencies running counter to exploration and manipulation

- Caution
- Contentment

Laughter

Fighting

- Defensive
- Aggressive

Self-Assertion

- Overcoming obstruction
- Resisting domination by other persons
- Seeking for power over things
- Seeking to dominate other people
- Rivalry
- Emulation

Submission

- Giving up in the face of obstacles
- Docility of the child
- Yielding to the domination of other persons

This classification has been constructed from the text and is believed to represent Woodworth's views. The critical reader will observe that there are many activities included

which appear to be acquired and many social activity values rather than unitary psycho-physical action patterns. For example, submission and self-assertion, manipulation, fighting, and the like, are not unit action processes but general evaluative or descriptive terms covering a great many inherited and acquired action and thought processes which are adjudged by society generally to have the meaning values indicated by the terms attached to them. This fact is evidenced by the circumstance that most of these terms carry subclassifications. This is one of the most complete classifications of instincts in the literature of psychology and behavior. But it is not as full as a classification based on Thorndike's *Original Nature of Man* would be. I have not felt sufficiently sure of all of Thorndike's interpretations and classifications to venture upon such an interpretative classification of his terminology at this time.[1]

Woodworth's classification is obviously of a mixed sort, judged by the categories of classification set forth in the earlier part of this chapter, but the dominant criteria of classification used are the functional or end and the response methods. He pays little or no attention to the matter of internal structure and organization, with the result that obviously the same structural processes, including in some cases the same stimuli, and in other cases the same responses, are classified under different instinct categories. This would certainly be true of self-assertion and fighting, of manipulation and curiosity, of exploration and locomotion, of gregariousness and mating, and of other cases also; although the author in question lists these as separate instincts. The fact is that the author, as is true of most writers on the instincts, rarely if ever gets down to the unit organization of activity as a basis for the

[1] However, the reader may, if he desires, attempt to make such a classification for himself from the text or from the data presented from Thorndike in Chap. XVI.

definition and classification of the instincts. He remains on the basis of complex social and personal values instead. Yet instincts are biological facts or organizations; they are structural and concrete. They cannot be mere words, abstract valuation processes, used as control symbols for the synthesis and distribution of activities of diverse sorts under one control category. Such abstract processes are acquired; are the product of civilization, not the result of hereditary selection. In this respect Woodworth errs in the same way in which the other psychologists quoted err. They do lip service to biology, in insisting upon an instinct theory of the interpretation of conduct or behavior; but they are short of biological insight, in that they are unable to distinguish between the concrete inherited activity processes on the one hand and the abstract acquired valuations on the other. They are far from getting down to the units of activity or even the native syntheses or organizations of inherited unit activities.

Perhaps it may be excusable to add one more general classification of abstract value terms, under the guise of instincts, to the list. Hocking has worked out his classification much more systematically and schematically than have the preceding writers, as will be observed from the diagram which follows.[1]

[1] W. E. Hocking, *Human Nature and Its Remaking*, 56. (Use of this diagram permitted by the author and his publishers, Yale University Press, New Haven.)

SURVEY OF THE HUMAN INSTINCTS

Positive (Expansive)	Aggressive	Negative (Contractive) Defensive
Instinct to Physical Activity (?)		Instinct to Inactivity(?)
Stretching		Preparation for Repose.
Rubbing Eyes, etc.		Sleep, Death
		FEAR (primitive)
Prehension		
Grasping		
Reaching, Pulling,	Pushing Away	
Shaking, etc.		
Locomotion		
Standing, Crawling,		
Walking, Running,		
Climbing, etc.		
FOOD-GETTING	Food	Aversion
Sucking, Swallowing,		
Carrying to Mouth,	Spitting Out	Averting Head
Biting, etc.		
Hunting	Protective (extension of parental?)	
Roving		Aversion to Blood
Acquisition (?)		
Construction (?)	Destruction (?)	
Shelter-Making (vestigial)		
CURIOSITY (primitive)	Aversion to Novelty	
Movements of Attending		
Manipulation, etc.		
SOCIABILITY	Anti-Sociability	
Vocalization		
Imitative Acts	Contrast Acts	
Gregarious Behavior,		Shyness
etc.		Secretiveness
	PUGNACITY (primitive)	
Domination		Submission
Display, etc.		Bending, etc.
Sex-Love	Sex-Aversion	
Courting, Copulation,	Rejection of Contact	Shame
Home-Making (?)		
Parental Love	Aversion to Children (?)	
Nursing, etc.		
Attachment to Parent		

Note. Instincts of second order (Curiosity, Play, Pugnacity, Fear) written across page. Units of behavior in Italics. Indentation indicates degree of generality, not genetic priority.

This classification does not differ essentially from the others as to types of criteria used. It is mixed in character. It shows the same overlapping. It fails to get down to the actual concrete basic inherited processes; it is external instead of internal. It goes even further in the wrong direction than the others, because it is so constructed as to place most emphasis upon the social organization and evaluative aspects. As pointed out in the preceding chapter, the general or "central" instincts of curiosity, play, pugnacity and fear made use of by Hocking, are not instincts at all, but are synthetic acquired valuations of adjustment processes and needs which have grown up as a result of the experience or education of the person exercising them. They function largely under cerebral cortical control and are the product of the workings of the conscious or partly conscious mind, which is obviously not inherited but is the product of experience and education. The attempt to distinguish positive and negative, aggressive and defensive, instincts also belongs to the external and nonspecific treatment of instinct. It is evaluative and synthetic instead of analytical and definitive. It does not enable one to distinguish instinct from habit, or to locate and manipulate the actual activity processes in the service of individual or social control.

Watson is very modest in his claims regarding his classification of the instincts. He appreciates more fully than most of the psychologists the limitations to biological heredity. Yet, his classification is, for concreteness and its purely hereditary content, perhaps the most dependable of all those cited here. He says, "It is impossible, with the survey of animal activity which has been made, to give anything like a complete inventory of the various classes of instincts, or to give a classification which will be accepted by any large number of investigators. Nevertheless, we should expect to

find, and indeed we do find, certain characteristic instincts in every species of vertebrates. If the animal has survived at all, it is necessary for it to have certain instincts which relate to food, shelter, reproduction, defense, and attack, etc. The table below may be found helpful in holding together the mass of material which one finds when examining the work of students of behavior, and naturalists." [1] Watson's classification follows:

I. Structural characteristics, action systems, etc.	Bodily characteristics by means of which species are determined; methods of locomotion, such as creeping, crawling, walking, etc.
II. Obtaining food.	Taking food from beak of parent; sucking, pecking, scratching, diving; selection of food (when not determined by habit, *e. g.*, herbivorous, carnivorous, etc.); the use of salt instead of fresh water; washing the food; methods of drinking, etc.
III. Shelter.	Stretching the wing to escape the sun; sunning, huddling, ruffling the feathers when cold, etc.; burrowing, taking up of abodes in hollow logs and trees; boring into timbers; hibernation, etc. Overlaps to some extent the group on sex and food.

[1] *Behavior*, 111–112.

IV. Rest, sleep, play, etc.	Night and day periods of activity, purely instinctive, since no structural peculiarities account for the differences; length of periods at nest; brooding or caring for the young; habits of sleep, *i. e.*, bodily attitudes chosen; play, hibernation, etc.
V. Sex.	Mating; copulation; nest site; material of nest; methods of building nest; number of eggs laid or young cast; length of mating period or period in which partnership endures; care of the young etc.
VI. Defense and attack.	Methods of attack, as lying on back; springing upward (to head and throat); spurring, goring with the antlers or horns, etc. Here belong also the hunting, stalking, seizing, and rending of live prey; shamming death; inflation of body; ejecting secretions, etc.
VII. Special forms of instinct.	Migration (possibly homing in general) as exhibited by birds, mammals, fish, reptiles. Possibly overlaps sex and food, but may be wholly independent of either. Mimicry.

VIII. Vocalization.	Calls, cries, sounds uttered in receiving food; during sex activity, etc. Shown in almost all vertebrate forms, but especially in the monkeys of the higher types and in birds.
IX. Unclassified and non-adaptive but complex and complete acts.	Strutting, dancing, inflation of cheek pouches; secretions of musk; elaborate nodding (as in the noddy tern).
X. Unclassified and non-adaptive, in this case random and abortive, sometimes appearing in one and sometimes in another combination, and sometimes in isolation.	(Discussed under reflexes, p. 110.)
XI. Individual peculiarities in response.	Reference is made here to very definite phenomena but ones hard to describe, such as persistence of the reverse in an attack on a problem (as shown in learning); boldness, individual tricks of hands, beak; ambidexterity or preponderating use of either right or left hand by any animal below man; probably hereditary but not known to be.

Of course it is not the intention to argue that such evaluational and abstract classifications of activities, and even of instincts, as those quoted in this chapter are not valuable. They are of the greatest significance in social control and in-

dividual training. But they are useful primarily as evaluations of activity types in a social situation and are not to be considered as accurate classifications and descriptions of native or instinctive processes. They constitute a large and valuable part of the subject-matter of the sciences of sociology and of education. But they belong to these subjects rather than to psychology, as this science has been developed historically. In its classification of instincts psychology should give us some criterion (1) for distinguishing one instinct from another, (2) for distinguishing instinct from habit, and (3) for acquainting us with the structure and organization of the instinctive processes themselves. Otherwise we cannot properly get hold of the instincts in our thinking and utilize them in the evaluative and constructive processes which are an essential part and function of sociology and education.

I shall not attempt at this point to arrange a classification of the instincts on a truly scientific basis. I do not believe that sufficient investigation has been made of the original or inherited activity processes to make this possible, except in the most temporary and fragmentary way. Watson is of the opinion that it is not possible to get a logical classification of the instincts. He says, "This has been tried many times, but it is certainly impossible to get a classification at present based upon any other grounds than that of general convenience." [1] The special investigations of particular instincts are slowly aiding us in the collection of the necessary data. And such works as those by Thorndike, Watson and Woodworth here cited throw considerable light upon the question. Shand's *Foundations of Character* also adds something to our knowledge of the subject through his analysis of the complex instinct categories into their component elements. To formulate a classification sufficiently accurate in its details would require more time than has yet been given to this

[1] *Behavior*, 113.

aspect of the subject and certain types of data which are as yet insufficiently available. In addition to the study of all the special investigations of the subject it would be necessary to go through the literature of experimental and descriptive zoology and make a complete list of all of the native reflexes and other presumably inherited activity processes in the whole field of animal life for comparative purposes. Finally, it would be necessary to study human reaction processes and types in the light of this comparative material and in the light of the conflicting social controls, arising from the distinctively human environment, operating both ontogenetically and phylogenetically, which tend to modify or repress the inherited activity processes of the lower animals. What has been attempted here is much less ambitions. It is in the nature of a criticism of the methods and presuppositions underlying current classifications of the instincts, looking forward to the formulation of a scientific method of procedure. It will be of value, however, to present in this connection, in the following chapter, the results of a statistical study of the current usage of the term instinct.

CHAPTER IX

SOME RESULTS OF INVESTIGATION

This and the preceding chapter afford some idea of the great variety of ways in which the term instinct is employed in the social sciences. In many cases it is a sort of catch-all for vague and indefinite ideas about the causes or relationships of activities. Writers, unable to account clearly for the occurrence of a particular behavioristic phenomenon on a purely objective basis, bring in the term instinct and use it as a charmed word, thus sidetracking further responsibility for an explanation. Race has been a similar term to conjure with, a stop-gap to a complete explanation of social phenomena in terms of scientifically determined facts. But now, as Ross says, "more and more the time-honored appeal to race is looked upon as the resource of ignorance and indolence." [1] In like manner the gratuitous appeal to instinct hitherto so popular has begun to be looked upon with deserved suspicion and to be met by a demand for further analysis of the objective facts concerned. In response to this new demand for a more critical use of the term instinct it has been restricted to more specific and definable activities. When employed as a definite concept it is applied to some specific act, either learned or inherited. In the preceding chapters it was suggested that very commonly no clear distinction is made between learned and unlearned activities in describing acts as instinctive. In this respect the investigators in the social sciences are not wholly to blame, for they have in large measure but taken over the usage of the

[1] *The Foundations of Sociology*, 309.

biologists.[1] The latter, dealing as they do primarily with lower forms of life, among which the proportion of learned to inherited activity patterns is relatively small, have uncritically applied the same conceptions and terminology to man. They are not sufficiently familiar with man and the large amount of cerebrally constructed action patterns, responding primarily to external environmental stimuli rather than to inherited structures, which civilized man possesses, to serve wisely as guides to the sociologist when he seeks to classify human activities. The sociologist must rework the field for himself and make his own classifications. He must of course make use of the data of the biological sciences, but he must be ever ready to employ this material with discrimination and to adapt it to the study of the problems to which the social life of man gives rise. He must not apply it en masse and uncritically.[2]

To ascertain the actual usage of the term instinct employed by present-day writers in the social and allied sciences an analysis of the works of several hundred contemporary authors was undertaken. These writings, published in nearly all cases since 1900, were purposely taken largely at random in connection with the general and special reading of the investigator and many of his friends. Also approximately an equal number of volumes (over 300) were searched for instincts by competent assistants. This plan was thought to be best, because it would insure that the subject-matter consulted would be that with which the average teacher would come in contact. Books on various subjects and in various fields, general and scientific articles, and in a few cases even current stories and newspaper

[1] While the biologists have not made a considerable use of the term instinct, the psychologists have employed this term to cover the biologists' concept of inheritance as it applies to the field of animal behavior. Instinct and inherited action patterns are identical concepts. Thus instinct is an aspect of inheritance.

[2] Several years ago a biologist of some standing remarked to the writer that it was to be regretted that the biologists had so largely neglected the human field and left it to the wild guesses of the sociologists.

articles, were in this way examined with care and completeness. The results are presented in the classifications given below. This plan resulted in the utilization of books not alone from the social and mental sciences strictly speaking, that is, from sociology, economics, political science and psychology, although most of the selections are from these general fields. Other volumes from the related provinces of history, education, philosophy and the social applications of biology were made use of in order to secure as wide a range of viewpoints as possible within scientific fields. Even novels and books on travel and general literature were, in some cases, included. It was thought that such a comparison of the employment of the term instinct in these different fields of thought and interest would be of considerable value for the purposes of the study. The selection of books was not confined alone to the scholarly treatises. Academically considered the range of selection runs all the way from set treatises and text-books in the various fields concerned to the more popular works designed for the general reader. It was expected that this diversity of selection would permit of some comparison with regard to the relative extent to which a scientific terminology is employed in the formal and the informal types of writing on social and other themes.

The collected list of instincts and instinctive attitudes made use of by these various writers has grown to such proportions, consisting at the time of writing, of approximately 300 typewritten pages, that it has not been found possible to present the results of the study in full and in the language of the writers themselves. This is very much to be regretted, since such a presentation would illustrate, as no abridgment by classification can, the excessive lack of agreement and standardization on the part of writers employing the term instinct. If one made a sufficiently extensive collection of instincts, it would seem to be possible to show that almost every activity,

either learned or determined by heredity, which has impressed some one as important has at some time or other been called an instinct. I have myself collected more than five thousand of these supposedly instinctive action patterns, representing a vast number of types of action and attitudes. In a very large, perhaps the larger, number of cases the action indicated is so general that no specific action pattern can be found or identified. The so-called instinct is characterized in terms of the end to be achieved or the value or function served, instead of in terms of the stimulus-response processes which constitute the psycho-physical aspects of the action or attitude. Thus the first and foremost rule for the identification and description of an instinct, as set forth in the preceding chapters, has in most cases been violated in practice by the writers studied. These facts of variation and indefiniteness of usage cannot be adequately presented by means of a mere classification, which inevitably reflects in large degree the maker's own viewpoint and preconceptions, however painstakingly he may attempt to allow the facts to speak for themselves. This could be accomplished adequately only by presenting completely and in detail the variations found, without suppressing any of them under an inclusive and arbitrary skeleton classification made by the compiler himself—a classification with which the writers cited would probably in no case agree as adequately representing them.

Following out the plan of allowing the writers to speak for themselves would, however, make it necessary frequently to present separately instincts which may properly be said to have the same meaning. Thus, it may be contended for example, that there is no difference in meaning between "instinct of acquisition" and "acquisitive instinct"; or between either of these and the "instinct of accumulation," "the collecting instinct," "hoarding instinct," and several others. With this view the compiler cannot wholly agree. Many in-

stincts which are not primarily directed towards acquisition may, under suitable conditions, assume an acquisitive bias. Thus, the so-called sex, fighting, play and construction instincts, for example, may be so expanded in application as to become secondarily acquisitive in their aims and expression. Under certain circumstances, these so-called instincts may even take on accumulative aspects, degenerating into habits of piling up the objects or experiences desired, as ends in themselves, beyond any possibility of utilization. Whether the writers employing the terms themselves intended to make such distinctions as here indicated is not ordinarily apparent from the contexts.

Again—and this is the more usual difficulty, from the standpoint of making a classification—there may appear in the collection two, five, ten, or a score or more instincts which apparently have much in common, but all of which have individually different shades of meaning. And since they are not described in terms of their psycho-physical action patterns, it becomes necessary to find, in so far as possible, some common category of aim, value, function, origin or form which will include as accurately as possible all of these different instincts under one heading. This difficulty is a very real one and may be illustrated briefly—and inadequately—from the experience of the writer in making the first of the classifications which appear in this chapter, although it applies equally well to those that follow. After throwing together those groups of instincts which more or less obviously belonged together, as indicated by some common elements of terminology, he found that this list was so long that it could not be printed. This serious difficulty however confronted him, that further condensation would in many instances necessitate the changing of terminology and thereby the shifting of meanings. A partial remedy was found in retaining significant or key words in the condensed classifica-

tions, each word representing one of the more closely related constituent groups of instincts. Thus the groups bad, base, debased, debasing, depraved, evil, immoral, undesirable, vicious, vile, wrong, representing altogether fifteen separate classes and twenty-eight separate instances or cases of instincts, were thrown together. But these terms, besides being only more or less key words taken from twenty-eight separate sentences representing as many more or less divergent types of activity, are not equivalent in meaning. Bad, base and evil group fairly closely together, but they may differ considerably from the other terms in the list. Debased and debasing may mean quite different things. Undesirable instincts may or may not be immoral or vicious or wrong. Such a grouping may represent so many variant meanings that it is rendered largely meaningless. But it was found that even further condensation was desirable, if possible. Should, then, there also be added to this group those instincts classified under the categories of brute, brutal, brutish, representing four classes and ten instances; abnormal, morbid, perverted, representing three classes and seven instances or cases; barbaric, barbarism, barbarity, representing four classes and five cases; coarse, crude, rough-hewn, rude, representing six classes and nine cases? To make such condensations would obviously destroy the unity of the classification, with the result that the classification itself would be largely or wholly useless for the purpose for which it was made.

But condensation through classification of some sort was obviously necessary, because of the physical impossibility of utilizing the more desirable method of presenting the writers' usage in their own language. Such distinctions of meaning and content as are here made or implied were, in all probability, not uniformly in the minds of the writers consulted when they made use of their terminology. This would appear to be clearly indicated by the great diversity of the classifications

reproduced in the preceding chapter. Consequently these writers would doubtless in some cases object to the classifications here accorded to their particular instincts. As regrettable as is such a discrepancy, it can scarcely be avoided. The wholly tentative classificatory arrangement here presented is necessary to draw some order out of the chaos which indiscriminate usage presents and thus to prevent hopelessly confusing the reader by the presentation of a vast amount of detail. Furthermore, the classification must be made on the objective basis of the writers' own terminology, even though subjectively they may have had in mind some other shade of meaning. The classification here offered is the simplest possible consistent with a fair degree of separateness of content. It conforms closely to common usage, as well as to that of the writers consulted, thus resulting in as little confusion and contradiction of meaning as possible among those authors cited. The chief difficulty here experienced, aside from that of the confusion resulting from overcondensation, is, of course, due to the fact that the writers have usually employed their terminology at random, without having in mind any consistent classification of their own. As was remarked earlier in this chapter, only too frequently the particular instinct employed is thrown in to fill a troublesome gap in the logic of the author's exposition. But even when he is using some reputed instinct advisedly and consciously, with full conviction as to its validity, he may employ some other instinct uncritically and without investigation. One of the most frequent sources of confusion in this respect is the tendency to speak of instincts in the physiological, moral and social spheres interchangeably, in spite of the fact that these different types of terminology are not directly comparable. This oversight with respect to distinctions is doubtless due to the current tendency to interpret all phenomena, social and moral included, from the standpoint of a simple biology. It has also at times proved difficult to deter-

mine from the context what the writer had in mind. The simple classification here presented attempts to correlate the usages found in so far as this can be done. Our first need in the determination of a scientific employment of the terminology of instinct is to understand what the present usage is. With this end in view the following classifications have been adopted on the basis of the terminology employed by the authors consulted.

The compilations made by the writer fall into four general divisions. These will be discussed briefly, each under its proper heading. Owing to limitations of space, only two divisions of the classifications are presented in the text. The other two are summarized briefly. The form of the tables has been adopted as the best method of securing clearness in presentation of the results. Where a large amount of condensation seemed desirable and possible, as many of the key terms of the included classes as the limitations of space would permit have been retained in the general type classifications, for the sake of preserving, in part at least, the distinctions of usage among the writers consulted. This, however, it is to be feared, has been done very inadequately. Numerical results have been presented in four columns under the headings of Classes, Authors, Books, Cases. The term Classes refers to the groups of approximately identical or similar "instincts" collected from various writers. These "instincts" were found to be so closely similar that they could be conveniently grouped under a single word or phrase. If space had permitted the list should have been presented under these several group headings, instead of under the general types. The term Cases covers the separate or individual instincts collected. Only by publishing these as collected from the literature could an adequate presentation of current usage be made, but the publishing of their totals is better than no presentation whatever. The number of

authors does not always coincide with the number of books, because it was possible in many cases to consult more than one work of an author. It is believed that the method of presentation here adopted will make it possible for the reader to study the classifications with profit and understanding for himself.

It should be remembered at all times that the writer does not hold that the lists here offered are either legitimate or exhaustive. On the contrary, most of the "instincts" here presented are not instincts; and it has been his experience that the list of classes and cases grows constantly, with almost undiminished rapidity, as additional authors are consulted. In the industry of collecting instincts there seems to be no law of diminishing returns.

1. Groups of Instincts. This is a classification of classifications of instincts. No specific instincts are included in this classification; these will be found in division number two. Here are listed all references to instincts in the plural, that is, to groups or classes of instincts, in the literature consulted. No attempt is made in this classification to distinguish between groupings of instincts on the basis of the general or specific functions served by them; that is, whether they are specific to the function or form from which they are named or whether they serve their function derivatively and by adaptation. The context from which these terms were taken do not permit of such distinctions. Consequently it is necessary to follow strictly the wording of the writers cited without attempts at interpretation. In most cases the writers themselves have not made such distinctions. For example, by the term "criminal instincts" the writer may intend to refer to instincts specific to criminal conduct or he may have in mind all instincts, including those not specifically adapted to criminality, which may be made to aid in criminality. Thus the "sex instincts," the "domestic instincts," or even

the "ethical instincts," if indeed these may be definitely enumerated, might conceivably be employed in such a manner as to promote criminality. Again, the term "reproductive instincts" may be used to cover those inherited activity structures or processes which are concerned specifically with the sex act, or it may refer to all instinctive processes concerned with the production and nurture of offspring. Such a general term as "altruistic instincts" might conceivably have reference to any instinct whatever which could serve the interests of others, the determination of the character of the instincts, in this instance as in others, being thus a matter of their functional relation to environment rather than of their biological structure. On the other hand, the term may be limited strictly to instincts involving an inherited attitude of benevolence, if there is such an inherited attitude. Even more would the "American instincts" or the "instincts of Asia" and the "Russian instincts" offer difficulties of classification. Whether the writers concerned mean to include all instincts found in those geographical areas or only those peculiar to them alone, or whether they have some other unexplained thing in mind, is not necessarily the task of the compiler to decide. The purpose here is as much to present the great diversity and lack of correlation of these groups of supposed instincts as to offer a list of the "instincts" themselves. Finally, not all of the separate types are here presented. Many, representing purely evaluative characterizations, such as separate, sound, strong, sure, have been left for listing under the category of Indefinite and Peculiar Instincts. In cases like these the type terms could have no conceivable relation to the structure of the constituent instincts. But the same may be said of many if not of most of the types actually included. These omitted types were, however, either so exceedingly indefinite or so trivial in character that it seemed best not to make the list unduly long by including them. It is difficult to know

where to draw the line, a fact which also bears testimony to the current confusion regarding the subject of instinct.

CLASSIFICATION OF INSTINCTS BY GENERAL GROUPS

Type	No. Classes	No. Authors	No. Books	No. Cases
Abnormal, morbid, perverted	3	7	7	7
Accumulation, acquisitive, appropriative, avaricious	6	6	6	6
Acquired, developed, perfected, resultant, unfolding	9	12	12	14
Active, activating, impulsive	4	5	5	5
Adaptive, coadaptation	2	4	4	15
Æsthetic, beauty, musical, musicians, rhythmic	5	5	5	6
Aggression, aggressive, assertive	3	4	6	7
Altruistic, benevolent, charitable, unselfish	8	14	14	23
American, Americans	5	2	2	5
Anger, irrascible	5	3	3	9
Animal, animals, animalism, animal-life	22	43	48	70
Antagonistic, contrary	2	3	3	7
Anti-social	5	10	10	40
Art, arts, artist, artistic	4	3	3	4
Ascetic	2	2	2	2
Atavistic	1	4	4	4
Attack, bellicose, combat, fighting, pugnacious, war	11	21	22	44
Barbaric, barbarism	4	4	4	5
Bad, base, debased, debasing, depraved, evil, immoral, low, undesirable, vicious, vile, wrong	20	27	27	42
Basic, fundamental, root, rooted	9	29	31	42
Being, biological, life, life-preservation	11	10	10	15
Blood-thirsty, blood-letting, ghoul	3	3	3	3
Bohemian, gypsy	2	2	2	2
Boy, boyhood	2	1	1	2
Brute, brutal, brutish	4	10	10	10
Business, business man, commercialism, financial	8	7	7	9
Chain, linked	2	2	2	2
Child, childhood, childish	9	8	9	15
Cleanliness, cleansing	2	3	3	3
Coarse, crude, rough-hewn, rude	6	8	8	9
Communal, corporate	3	5	5	5
Competitive, rivalry	3	3	3	4
Complex, compound, compounded, combined	4	5	5	7

CLASSIFICATION OF INSTINCTS BY GENERAL GROUPS—*Continued*

Type	No. Classes	No. Authors	No. Books	No. Cases
Concealment	2	1	1	7
Conquest	1	1	4	4
Conservative, reactionary	2	6	6	6
Constructive	2	6	6	7
Coöperation, mutual	4	3	3	5
Courtship	2	2	2	4
Creative	1	4	4	5
Criminal, lawless, mischief, offender (of)	5	10	10	16
Dangerous, harmful	2	4	4	4
Defense, defensive	3	4	4	4
Deferred, delayed	2	5	5	8
Definite, fixed, formulated, hard and fast, rigid	5	10	11	21
Democratic, leveling	4	7	7	7
Destruction, destructive, to destroy	5	5	5	13
Detective	1	2	2	2
Disgust	5	1	1	13
Domestic	2	1	1	3
Egg-laying, eggs (regarding)	2	2	2	2
Ego, egoistic, egotistical	8	15	15	54
Elemental, elementary	2	6	6	6
Expansion, expansive	2	2	2	2
Family	7	8	10	12
Farmer	2	2	2	2
Fear, fright	4	5	5	16
Feeling, emotion, emotional	3	6	6	10
Female, feminine	3	3	3	4
Ferocious	2	3	3	3
Filial	2	2	2	2
Flight, flying	2	2	2	8
Food, food-getting, feeding, hunger, nutrition	7	6	6	10
Fragmentary	2	4	4	14
Friendly, friendship	2	2	2	2
Gang, crowd, herd	17	19	20	82
General, generalized	2	7	7	17
Good, decent, ethical, moral, right, virtuous, wholesome	18	27	27	35
Great, major	5	7	7	12
Gregarious, gregariousness, association	5	15	17	22
Gross	2	2	2	2
Healthy	1	4	4	4
Hereditary, inborn, inherent, inherited, native	11	31	31	51

CLASSIFICATION OF INSTINCTS BY GENERAL GROUPS—*Continued*

Type	No. Classes	No. Authors	No. Books	No. Cases
Heretic, radical	2	1	1	2
Home-building	2	1	1	2
Human, man, mankind	25	61	70	221
Imitation, mimicry	2	2	2	2
Incomplete, immature	3	2	2	3
Independence (of)	2	2	2	2
Indefinite, non-specific, vague	3	6	6	10
Individual, individualized	3	9	9	18
Individualism, individualistic, non-comformist	3	8	8	14
Insurgent	2	2	2	3
Intellectual, reflective, thought	4	3	3	8
Jealous, jealousy	2	2	2	2
Justice	1	2	2	2
To kill, killing, murder, murderer	5	4	4	5
Lesser, minor	2	4	4	4
Licking	2	2	2	2
Locomotion, locomotory	2	2	2	8
Love	2	2	2	2
Loyal, loyalty, allegiance	4	4	4	4
Male	2	2	2	3
Mammalian	2	2	2	2
Masses	3	3	3	3
Maternal	4	9	9	12
Mating	2	3	3	4
Mechanical	2	2	2	2
Mental	3	3	3	3
Migration, migratory, nomadic, roving	4	4	4	4
Military, militarism	2	2	2	2
National	5	7	7	10
Natural	5	42	45	61
Negative	1	2	2	4
Negro	3	3	3	5
Nest-building	2	2	2	2
New, newer	2	4	4	4
Non-military, pacific	2	2	2	2
Normal	1	6	6	7
Organic	2	2	2	2
Original	1	3	3	5
Ownership, proprietary	2	2	2	2
Parental, parenthood	3	12	13	27
Perfect, perfected	2	1	1	2

CLASSIFICATION OF INSTINCTS BY GENERAL GROUPS—*Continued*

Type	No. Classes	No. Authors	No. Books	No. Cases
Periodic	2	4	4	7
Permanent, persistent	2	2	2	2
Personal	1	2	2	4
Phylogenetic	2	1	1	2
Physiological	2	2	2	2
Play, recreational, sporting	5	7	7	11
Political	2	5	5	5
Polygamous	2	3	3	5
Popular, people (of)	5	7	7	9
Positive	1	2	2	2
Powerful, strong	9	17	18	28
Precocious	1	2	2	2
Predatory	5	12	12	14
Primary, prime, principal, dominant, chief	9	17	17	35
Primal, primitive, old, ancient, early	17	41	45	107
Profound, pronounced	2	3	3	4
Protective	2	5	5	5
Prudential	2	1	1	2
Public	2	2	2	2
Public opinion (of)	1	2	2	5
Pushing out the hands, reaching	2	2	2	2
Race, racial	12	16	17	48
Rebellious, resistance	2	2	2	2
Reflex	2	2	2	2
Regulative	1	3	3	6
Religious, devotee, piety	5	16	16	20
Repressed, suppressed	2	4	4	4
Reproduction, reproductive	4	9	9	16
Russia (of)	2	1	1	3
Savage	4	8	8	8
Savage (of)	2	3	3	4
Scholarly, scholars (of)	2	2	2	2
Scientific	3	2	2	3
Sea-faring	2	3	3	3
Secondary	1	3	3	3
Self-assertive	3	5	5	8
Self-defense	3	3	3	9
Self-maintenance	2	2	2	2
Self-preservation, self-preservative	5	14	14	36
Self-regarding	2	4	4	12
Selfish	5	7	7	7

CLASSIFICATION OF INSTINCTS BY GENERAL GROUPS—*Continued*

Type	No. Classes	No. Authors	No. Books	No. Cases
Sensual	1	2	2	2
Servant (of), service, slavish	3	3	3	3
Sex, sexual	12	38	40	126
Simple	4	10	10	18
Sleep, rest	2	1	1	2
Sociability, sociable	4	3	3	6
Social	14	66	74	222
Special, specialized	2	10	10	17
Specific	1	6	6	9
Spiritual	1	2	2	2
Stealing, thieving	2	2	2	2
Subconscious, unconscious	2	2	2	2
Subjugating	2	1	1	2
Submissive	2	2	2	3
Survival	2	1	1	2
Sympathetic, kindly, generous, humane	9	15	16	20
Tender	1	2	2	2
Traditional	2	2	2	2
Transient, transitory	2	3	3	5
Tribal	3	3	3	7
Universal	2	1	1	2
Vague	1	4	4	5
Variable, varying	2	2	2	2
Vital	1	2	2	2
Vitiated	1	2	2	4
Wagner's	2	2	2	2
Weak, waning	4	3	3	7
Women, womanly	10	9	9	13
Workers'	2	2	2	2
Miscellaneous	139			167
Totals	849	250	295	2539

The miscellaneous groups or classifications, that is, those classifications which are mentioned only once, are as follows: achieving, adolescence, adventurous, advertising (of the Romans), African, of ants, approach, Asiatic, back-dragging, of young birds, burrowing (of rodents), serious business of life, cannibalistic, capitalistic, strange instincts of cattle, central, character, of the Chinese mind, chivalrous, of civili-

zation, class, climatic, Comte's sociological instincts, contrary, contractive, of the country, England's creditor instincts, critical, curative, curiosity, danger, dictatorial, of the digger-wasp, disinterested, dramatic, of duty, of the East, of ejection, English, ennobling, environmental, forward-looking, of France, of function, gambling, genetic, of genius, of a gentleman, gynecocratic, Hellenic, of the hermit crab, heroic, historic, homing, homosexual, honor, hunting, imperialism, infantile, Jewish, law-abiding, of legality, legitimate, of the lexicographer, liberal, luxury, manipulative, marital, masterly, materialistic, mechanistic, mercenary, of the miser, modern, monogamous, of nationality, Nietzsche's, non-rational, non-social, of a painter, paternal, of the philosopher, physical, plant, plastic, polyandrous, of the preacher, preening, prophet, of proletarians, provident, psychical, of Puritanism, pursuit, perceptive, rejection, remote, Roman, running, sadistic, of the Satyr, sedimentary, self-abasement, of the objective self, self-sacrifice, sense, of shaking the body, of sheep, shelter, shrinking, silence, of the slave-owner, of the slavophile, of French and English sociologists of to-day, of solitary men, somatic, stalking, strife, success, sucking, suggestion, swimming, teasing, tertiary, town life, unChristian, undeveloped, unitary, unlawful, unsocial, vegetative, vocalization, vulgar, walking, wandering, wild, wily, workmanship.

The present survey of approximately five hundred books and periodicals, representing slightly over four hundred authors employing the concept of instinct, has disclosed no fewer than 849 separate types or variations of types of instincts. Of these, 504 titles or types, were sufficiently distinct to warrant preserving them as separate classification terms in the table although two or more titles were frequently included in one group of related types. Finally, when all condensation had been carried as far as seemed possible—too far, in fact, to preserve all reasonable marks of distinction—there remained

325 separate or irreducible groups of types or separate classes. If we consider either of these three numerical terms—848, 504 or 325—to be a proper measure of the number of separate types, we find the number of classes of instincts sanctioned by current usage to be very large indeed. The number of separate classes used by the most extravagant author quoted in the chapter on classifications in this book is only a small fraction of the total number discovered by this analysis. More striking evidence of the chaotic condition of the theory of instinct could scarcely be anticipated.

It will also be observed in consulting the preceding table that these constituent types or classes are by no means mutually exclusive. They overlap and cut across one another in every conceivable direction. However, certain classes and types stand out especially strikingly, thus indicating a considerable uniformity of usage. Among these may be mentioned (to give only the initial or outstanding word in each group) the animal, bad, biological, criminal, crowd, egoistic, family, fear, feminine, fighting, food, gang, good, gregarious, herd, hereditary, human, natural, parental, play, popular, powerful, predatory, primary, primal, racial, religious, reproductive, savage, self-preservative, sexual, simple, social, special and sympathetic groups or classes of instincts. The classes or types of instincts implying association and sympathetic or friendly attitudes, on the one hand, and those implying anti-social action or emotion, on the other hand, bulk largest. Other general groups of classes or types implying civic attitudes, self-advancement, sexual desire or gratification, family, æsthetic, ascetic, and self-display interests were also significantly prominent.

II. Specific Instincts Classified in Groups. These are supposedly specific inherited stimulus-response activities of individuals and are presumably therefore of a biological

character. They occur in the texts in the singular only, while the examples of the preceding list always appeared in the plural. Therefore, the present groups of instincts are specific instances instead of terms of classifications. Again it should be stated that no attempt is made to go beyond the terminology of the writers cited. This classification is made objectively on the basis of the language of the writers themselves. What reservations or exceptions they may have had in mind cannot be definitely ascertained and it is probably worse than useless to speculate regarding such matters. If the term "instinct of imitation" or "imitative instinct" is used, for instance, the compiler is not able to determine whether the idea which was meant to be conveyed is that there is a special mechanism for imitation or whether it is to be supposed that any instinct may be employed in the process of imitation. The presumption would normally be in favor of the former interpretation and that is the assumption here made in classifying these "instincts" as specific. That is, the most obvious meaning of the term is in each case the one applied, unless a contrary interpretation is clearly indicated. In other words, it is assumed, in keeping with the proper definition of instinct, that the instinct or activity concerned is a biological structure and process rather than a social or individual abstraction. These specific instincts are for the sake of convenience grouped under two general headings: (1) Instincts classified in groups according to similarity, and (2) Miscellaneous instincts not easily classifiable. A total of twenty-two groups or classifications have been distinguished, exclusive of the general list of miscellaneous specific instincts. These have been arranged in tables, similar to the table preceding. For the sake of economy of space specific instincts occurring only once are listed alphabetically immediately following the table which contains those instincts occurring in two or more distinct forms or functions.

The twenty-two groups or major classifications here submitted in as many tables are not necessarily the best possible ones that could be made. Other classifications cutting across these might be constructed, under perhaps as many general headings as are contained in the preceding table. However, it seems to the compiler that the usage of the various writers consulted indicates the superiority of the selection and arrangement here offered. Some compilers would doubtless have made a larger number of classifications and corresponding tables. For example, the group of so-called self-assertive instincts might easily have been broken up into major groups such as those of action, self-assertion, self-preservation, ambition, ascendancy, combativeness and egoism. The reader will discover similar possibilities of subdivision in other groups here listed. On the other hand, some compilers would doubtless have combined some of the classifications here presented separately, such as, for example, the recessive and self-abasement groups, or the family and sex classifications. It has been the aim of the present compiler, however, to follow the lead of the current usage, in so far as he could determine it, rather than his own inclinations. He merely presents what he finds, and, in the present chapter at least, does not attempt to indicate either what should be, or the truth or the falsity of the so-called instincts and instinct classifications here given.

THE ÆSTHETIC INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Æsthetic	1	3	3	12
Art, artistic, appreciation of art	7	13	13	21
Beauty, for the beautiful	3	7	7	8
Cleanliness	1	4	4	4
Dramatic, of dramatist, histrionic	4	15	15	36
Happiness, joy	2	2	2	2
Musical	1	5	5	5
Pleasure, pleasure-pain	2	2	2	4
Poetic, poetry, of poet	3	3	3	3
Rhythm, rhythmic	3	6	6	10
Style	1	4	4	21
Miscellaneous	23	16	16	26
Totals	51	50	51	152

The miscellaneous æsthetic instincts occur as follows: Lamb's fine instinct for apocalyptic passages, Apollinian, appreciation, love of ceremonials, clean-hand, instinct for contrast and harmony in tones and hues, love of festivities, to take pleasure in expressing mental states to others of the species, harmony, humor, literary, love of nature, love of ordeals, mimetic, narrative, instinct of the girl to pat and arrange her hair, personating, Brown's (Charles Brockden) instinct for realistic detail, instinct for the refinements of the feeling of liberty, rhetorical, richness of sound, to sing, symmetry.

[1] See workmanship, self-display, play, sex, self-assertion instincts.

THE ALTRUISTIC INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Affection	1	2	2	4
Altruism, act for the good of others, help others	6	16	17	21
Amiable, amenity, friendly, good will	4	2	2	4
Humane, humanitarian	3	4	4	5
Kindliness	1	2	2	2
Love	2	4	4	4
Pacific, peace	2	2	2	2
Pity	1	2	2	2
Protective	6	10	11	13
Sacrifice	2	2	2	2
See others well-off and happy	2	2	2	2
Sympathy	2	18	19	28
Tender, tenderness	3	3	3	19
Miscellaneous	9	7	7	11
Totals	44	49	56	119

The specific altruistic instincts not included in the above table are: To avoid unnecessary fuss and suffering, caretaking, "the drayman's instinct of chivalry," instinct of Christianity "to impregnate the meanest man with its soul," "instinct of the desire to liberate the Christian subjects of the Sultan," fighting for mates, generous instinct, instinct to please, to preserve life.

[1] See the gregarious, family, ethical, self-abasement, sex instincts.

THE ANTI-SOCIAL INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Aggressive, aggression, attack, hostility	4	3	3	4
Anti-sociability, surly	2	2	2	4
Instinct for blood, sanguinary	2	3	3	3
Brutal, brute	2	4	4	4
Conquer, conquest, subjection, subject others, slave-making	6	7	7	11
Crime, criminal	3	3	4	8
Cruelty	2	5	5	6
Destroy, destruction, destructiveness	6	7	7	22
Egoism, egotism	4	4	4	6
Envy	1	5	5	8
Greed	1	5	5	7
Hate, hatred	4	5	5	5
Homicide, murder	2	2	2	2
Kill, killing	4	6	6	12
Obstructing, refuse coöperation	2	2	2	2
Persecution, impose	1	3	3	3
Plague, plaguing people	2	1	1	2
Plunder, predaceous, predation, predatory, rapacity, spoils	8	15	15	19
Pursue, pursuit	2	2	2	2
Rage	3	3	3	3
Savage, fierce	3	3	3	3
Selfishness	2	3	3	4
Teasing	1	2	2	2
Theft, fraud, steal, stealing	5	3	3	8
Threatening, threats	2	1	1	3
War, war fever, war-like, delight in war, military, belligerent, conflict, fight for fighting's sake	9	8	8	15
Miscellaneous	17	15	15	17
Totals	100	69	75	185

The miscellaneous instincts in this group distribute as follows: anarchic, instinct for autocracy, base instinct, instinct to catch small objects, instinct of the upper-class Mexicans "to consider themselves as a people apart from the lower classes,"

[1] See the retaliative, self-assertive, sex, fear and flight, disgust instincts.

dislike-and-indifference, instinct to dismember small objects, instinct of human wickedness, of individualism, to inflict pain, isolating instinct, instinct of lust, offensive instinct instinct for the pathological, of a vagabond and outcast, vicious instinct.

THE INSTINCTS OF DISGUST OR REPULSION [1]

Type	No. Type	No. Authors	No. Books	No. Cases
Avoidance	2	2	2	2
Disgust, tactile disgust, visual disgust	6	5	5	15
Push or thrust a disgusting person or object	4	1	1	4
Rejection	2	2	2	2
Repulsion, repulsive	4	11	11	22
Retch, vomiting	2	1	1	2
Shake off a disgusting object, shaking	2	1	1	3
Spit out, spitting	3	3	3	5
Turning away the body, eyes or head	4	2	2	6
Miscellaneous	10	3	3	13
Totals	39	21	21	74

The miscellaneous instincts of disgust or repulsion are aversion to blood, food aversion, blowing out, choking, cleansing, ejection, grimacing, personal isolation, shrinking, and shuddering.

[1] See the aesthetic, fear, food, sex, self-abasement, recessive instincts.

THE ECONOMIC INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Accumulation, collection, gathering	8	15	15	60
Acquisition, acquisitiveness	8	36	39	110
Appropriation, appropriative	3	3	3	4
Business, business man's	4	5	5	8
Commercial	2	4	4	4
Cupidity, grabbing	2	2	2	2
Economy	1	4	5	5
Hoard, hoarding, save	4	6	6	12
Ownership, possession, property, proprietary	12	24	25	58
Save, thrift	2	2	3	3
Utility, utilize	2	3	3	3
Miscellaneous	12	10	10	12
Totals	60	69	78	281

The miscellaneous economic instincts are as follows: "The accountant's instinct to put aside realized income in favor of earnings," bargain-helping, barter, competition, earning, economic, l'instinct d'esclavage, the instinct of capital to seek indefinite expansion, l'instinct de salariat, l'instinct de servage, trading, and the instinct for wealth.

THE ETHICAL INSTINCTS [2]

Type	No. Classes	No. Authors	No. Books	No. Cases
Ethical, moral, morality	7	18	18	23
Fair-play	2	2	2	2
Good, righteousness	2	2	2	2
Honor, honesty, personal integrity	3	3	3	3
Justice	3	8	8	8
Nobleness, which scorns a mean act	2	2	2	2
Miscellaneous	8	7	7	8
Totals	27	35	36	48

[1] See the self-assertive, food, family, workmanship, play, self-abasement, intellectual, anti-social instincts.

[2] See the gregarious, self-abasement, altruistic, family, intellectual, æsthetic instincts.

The miscellaneous ethical instincts are the instincts for compensation, decency, duty to fellow man, enforcement of law, of a gentleman, of leaving another man's home alone, and "that things belong to those who most need or can best use them."

THE FAMILY INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Brooding, incubation, nesting, setting	4	6	6	15
Care of offspring, feed the young	12	8	9	17
Defend family, fighting for mates, guard family	3	3	3	3
Fly to deposit eggs on meat for larvæ to feed on; in gravel of shallow brook	2	2	2	2
Domestic, domesticity, domestic affections	3	6	6	6
Egg-laying	2	2	2	2
Family; family affection, life, love, loyalty; durable alliances	12	16	16	27
Filial, filial affection, infantile response to maternal impulse, react to parents	4	5	5	5
Follow the mother, following the hen	2	2	2	3
Fondle, pet	2	1	1	2
Home, home-making, housing	4	7	7	8
Of mother and young to know each other by call, odor	2	1	1	2
Maternal; maternal affection, love; maternity, mother, motherhood	14	41	44	114
Parental; parental affection, aid, love; parenthood	7	38	43	185
Paternal, paternal love	2	7	7	11
Tender; tender emotion, feeling	4	3	3	7
Miscellaneous	4	4	4	4
Totals	83	82	91	413

The family instincts here classified as miscellaneous are the feminine instinct of desire for children, kin-instinct, love for young, and singing to young.

[1] See sex, food, altruistic, gregarious, ethical, self-abasement instincts.

THE FEAR AND FLIGHT INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Avoidance of danger	3	3	3	3
Call out, crying, crying for help, screaming, wailing	6	5	5	9
Clinging, clutching	3	3	3	4
Concealment, hide, hiding	4	6	6	18
Distrust, suspicion	2	3	3	3
Escape from danger, from restraint; flight, to flee; retire, run away, running	15	22	23	59
Fear, fearing; cat-, mouse-, precipice-, snake-fear.	14	32	35	129
Immobility, lying flat on ground, paralysis, rigidity, sham death	7	4	4	11
Secretiveness	1	4	4	5
Seek safety	2	2	2	2
Shrink, shrinking	5	4	4	9
Shyness	1	5	5	6
Miscellaneous	24	13	13	29
Totals	87	52	55	287

The miscellaneous fear and flight instincts include an instinct of some catastrophe, of the spider to cover its nest, of contraction, of crouching when startled, for the dangers attendant upon a spirit of expenditure, of fighting at bay, to get closer to companions, an instinct which "forbids the Turkish peasant to inhabit a lonely farmhouse," irrational response of pain, the instinct of the rabbit for leaping over pursuing dogs, the instinct which prompts us to rush out of a theater when some one shouts that it is on fire," of pushing away, of a jack rabbit to run in a circle before a coyote, of security, to seek assistance, shaking, of silence, to go to sleep under cover, of young mocking-birds to go into spasms at the sight of an owl or a cat, of starting back, of swerving suddenly from a suspicious rustling, trembling, and of turning back from a pursuing animal.

[1] See self-abasement, recessive, self-assertive, family, anti-social instincts.

THE FOOD INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Biting	1	2	2	5
Carrying objects to the mouth	2	2	2	4
Chase, catch food	2	3	3	5
Chewing, chew gum	2	3	3	5
Eat, eating; eating eggs, grass, meat	5	6	6	10
Feed, feeding	3	5	5	17
Fish, fishing	2	2	2	2
Food; gathering, getting, gorging, seeking, selecting food	8	13	13	26
Grinding the teeth	1	2	2	2
Hunger	2	16	18	33
Hunting, trapping	3	21	21	44
Nurse, nursing, sucking	4	13	13	19
Nutrition, nutritive, nourishment	3	10	10	18
Pecking, pick up and swallow small objects	3	7	7	11
Thirst	2	2	2	2
Miscellaneous	21	7	7	25
Totals	64	59	65	228

The miscellaneous food instincts consist of an instinct of the protozoan to absorb smaller creatures which contain nutriment, of the monkey to crack an egg against his upper teeth, instinct of "a positive chemotropism of the mother insect for the type of substance serving her as food," instinct of the sea-anemone to close its tentacles over its prey, instinct of insects to "crawl directly upward on the shrub where they find the leaves on which they feed," of the monkey to hold the egg-shell up to the light to see that there is no longer anything in it, of an insect to lay its eggs on a substance which serves as food, to lay up stores for winter, for intoxication, killing, looking for food, provisioning instinct of the solitary wasp, instinct of the monkey to pull the covering from a nut, roving instinct (in search of food), instinct of the fish to seize its prey by direct motion, of the monkey to suck the substance from an egg, swallowing instinct, instinct of the eagle to swoop on the rab-

[1] See the family, play, disgust, anti-social, self-assertive, altruistic instincts.

bit, of the monkey to throw away an empty egg-shell, tasting instinct, and "an instinct of the Jew against Terefa, unclean food—*i. e.*, unfit for consumption by the Chosen People, or prepared by non-Jews."

THE GREGARIOUS OR SOCIAL INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Adaptation, adaptive	2	2	2	3
Association, contact, society	6	8	9	11
Brotherhood, clan, clannishness, kind, solidarity	9	8	10	16
Communicative	2	2	2	2
Companionship, fellowship, sociable, sociability	7	15	15	28
Conformity, conform to law, conventionality, form	4	5	5	7
Coöperation, mutual aid, stand together, work in harmony	9	9	9	10
Democratic, democracy	4	8	8	10
Ethnical isolation, ethnical separation	2	2	2	2
Fidelity; loyalty—to individuals, society, state, native soil; public spirit	6	8	8	18
Gang, gang-life, gang-forming	4	6	6	11
Government, governmental	2	2	2	2
Gregarious, huddling	6	37	41	133
Group, group-action, group-forming, group self-preservation	9	12	13	17
Herd, herding, herd-preservation; masses, mob	12	24	27	146
Hospitality	2	2	2	2
For law, order; against social disturbance	3	2	2	3
For the majority, mediocrity, regularity	3	3	3	3
National; nationalism, nationality; national life, pride, self-preservation	9	11	12	16
Party, partizanship	2	2	2	2
Patriotism, devotion to state, love of native land, civic pride	6	8	8	19
Of the people, popular	5	4	4	8
Political	3	6	6	7
Race; race prejudice, purity, safety; of the breed	6	13	13	27
Social	5	65	71	170
Of the species, struggle for life of species	2	2	2	3
Tribal	4	3	3	4
Miscellaneous	15	15	15	17
Totals	149	150	172	697

[1] See altruistic, ethical, family, self-abasement, sex instincts.

The fifteen miscellaneous types of gregarious or social instincts are as follows: instinct of a common origin, of confidence, to be controlled by the common sentiment of their fellows, low demagogic instinct, hive instinct, instinct of the socialists towards international relationships, local attachment, moral unity, an instinct which creates the social life of an ant-hill, Augustus' wonderful instinct as a social reformer, instinct of social self-preservation, of social selfishness, of social service, to exact unified conduct even at the cost of coercion.

THE INTELLECTUAL INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Critical	2	2	2	2
Curiosity, inquisitive	5	38	41	138
Dialectic, discussion	2	2	2	2
Discover, divine, divining, invention, investigate.	6	3	3	8
Experiment, explore	2	2	2	3
Generalizing, for theory	2	2	2	2
Historical, historical method	2	3	3	3
Intelligence, exercise intelligence	3	3	3	3
To judge, juridical, decide rightly	3	3	3	3
Know, knowing, knowledge, learning	4	4	4	4
Logical, parsimonious instinct of the human mind, dissecting and reconstructing vital problems	3	3	3	3
Mathematical	1	2	2	2
Mental, mental activity, mental control	5	3	3	15
Order	2	2	2	2
Purpose	2	2	2	2
Ratiocination, reasoning, reflection, speculative, theoretic, thinking, thought	9	8	8	11
Scientific	2	4	4	4
True, truth	3	3	3	3
Wonder	1	2	2	2
Miscellaneous	47	30	31	50
Totals	106	80	86	262

[1] See the workmanship, ethical, æsthetic, self-display, self-assertive, self-abasement instincts.

The miscellaneous intellectual instincts are both numerous and, for the most part, unusual. They are as follows: Instinct of astuteness, to choose immediate ends, of comparative method, the German instinct for comprehension, instinct of the "conviction that it is better to bear the evils they have grown accustomed to, through long, even though bitter experience, than to take the risks that may be involved in new ones," of the demand for sociology, "that instinct which has hitherto recognized the vital necessity to ourselves of maintaining this doctrine (of the native equality of man) in its most uncompromising form," educative instinct, "the thoroughly English instinct that what a man cannot earn, or get for himself, he does not deserve," the politician's "unfailing instinct for exhausting every wrong device before trying the obviously right one," instinct for the expert, to find this place, "that instinct . . . which has consistently insisted that it is only through the aid of the law that unskilled labor can ever be enfranchised in its relation to capital," "a profound instinct (which) arms them (the English) against intelligence, which they recognize as the greatest foe to action," the instinct "that nothing else than the general will consciously acting under a sense of responsibility to principles transcending all the claims of existing competitors, and acting, therefore, in the interests of the process of our social evolution as a whole, can ever hold the stage open and free in the conditions in which we see modern industrial competition tending universally towards monopoly control," "instinct for picking . . . (scraps of thought) out at sight from a mass of rubbish," "the instinct of those who desire some higher authority which will prevent war," "pure instinct of principles," the sociologists' "instinct of the oneness of all knowledge about men," "the instinct . . . that prompts him to tell his brother what he thinks," the instinct to recognize the justice of the demand of India and Egypt for self-governing institutions, to

regulate and harmonize the instincts concerned in the life of the larger social groups, "instinct of the one animal to relate the other animal to aggression or harmless agencies in his surroundings," "the mind is a rule-demanding instinct," empiric instinct of rule of thumb, instinct of the scholar, "some instinct told us that this (that right of self-determination does not apply within the British Empire) was the case," "instinct that there is something wrong in our social machinery and that society is gravitating toward a crisis," of choosing sides through leadership, "a sound instinct that led Mill to take up the problem of distribution before taking up the problem of value," "instinct that something in the (industrial) system is profoundly wrong," "the nation showed a sound instinct in supporting the constitutional party," "a sure instinct tells him what is intellectually bad," "with the surest instinct he brings into prominence and analyzes each symptom of the ailment," instinct of tact, "an instinct which tells me that death plays its part in life," "some instinct taught Washington that his present lack of money would be an obstruction, though possibly not a bar to his hopes," "instinct to test themselves in terrible trials," "some instinct had told him from the beginning that this was a bad man, an evil-minded man," instinct of understanding self, "that unerring instinct which makes the common people hit on just the right word," unifying instinct, "instinct of the unwillingness of men . . . to marry and bring up families in a state of life lower than that in which they themselves were born," instinct of utility in personal eclecticism, of visual exploration, "our English instinct which warns us against being sure that things are what to the unaided intelligence they seem to be," instinct to watch.

THE IMITATIVE INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Imitation, imitative, mimicry	11	29	33	85
Suggestion, suggestibility	2	2	2	3
Miscellaneous	3	3	3	3
Totals	16	32	34	91

The miscellaneous instincts of imitation are "a general copying instinct," instinct to follow the occupation of the father, and "an instinct that leads one to do as others do."

THE MIGRATORY AND CLIMATIC INSTINCTS [2]

Type	No. Classes	No. Authors	No. Books	No. Cases
Hibernate	2	1	1	2
Home-finding, homing	5	5	6	15
Migration, migratory	8	21	21	28
Nomadic, roaming	2	2	2	3
Runaway, running-away	2	1	1	2
Wander, wandering, wanderlust	3	4	4	4
Miscellaneous	9	2	2	10
Totals	31	28	29	64

The miscellaneous migratory and climatic instincts include the instinct of geese to call loudly as they go, climatic instinct, the instinct of the bobolink to fly mostly in the night, of geese to fly far, of geese to fly high, of the dog to find his way home at night by the sense of smell, periodic instinct, the instinct of geese to range themselves in wedge-shaped flocks, and of the bobolink to straggle away one at a time.

[1] See the play, food, gregarious, self-assertive, æsthetic, altruistic instincts.
[2] See the play, food, gregarious, workmanship, sex instincts.

THE PLAY INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Adventure, change	4	3	3	7
Chasing, being chased	2	2	2	2
Doll	2	1	1	2
Gambling, lottery, speculative	4	8	8	15
Play, recreation, sport	15	48	51	122
Miscellaneous	17	9	10	20
Totals	44	57	61	168

The relatively numerous miscellaneous play instincts occur as follows: clog and jig dancing, to conceal, daydreaming, foolhardiness, Get-rich-quick-Wallingford instinct, instinct for a good time, to hunt for hunting's sake, of parrots to imitate the sounds they hear, of the shrike to impale small birds and beetles on the thorns about its nest, juvenile instinct (for play), instinct to make a noise, of young beasts to have mimic fights, "to people the darkness or an unfrequented wood with nameless monsters," the romantic instinct of youth, of the boy to run to fires, of parrots to talk, and of young beasts to wrestle.

THE RECESSIVE AND REPOSE INSTINCTS [2]

Type	No. Classes	No. Authors	No. Books	No. Cases
Ascetic, asceticism	2	1	1	4
Aversion to novelty, conservative	2	3	3	4
Comfort, repose, rest	3	3	3	3
Conserve, conservation	5	4	4	5
Isolation, love of solitude, privacy	3	3	3	4
Shelter, sheltering	3	1	1	4
Sleep	1	2	2	2
Stay put, remain where born, take same course just taken, uphold status quo	4	4	4	4
Miscellaneous	3	3	3	6
Totals	26	19	19	36

[1] See the imitation, food, æsthetic, workmanship, self-assertive, intellectual, self-display, sex, anti-social, fear instincts.

[2] See the self-abasement, fear, economic instincts.

The miscellaneous recessive and repose instincts are the disinterested instinct, instinct to inactivity, and the instinct to root himself to the soil.

THE RELIGIOUS INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Faith, against reason	4	2	2	4
Future life, immortality	2	2	2	2
Regard a higher power	1	2	2	2
Religion, religious, reverence	8	24	25	55
Superstition	1	2	2	4
Worship	3	5	5	5
Miscellaneous	11	8	8	11
Totals	30	34	36	83

The miscellaneous religious instincts are very similar to those listed above. They are the animistic instinct, instinct of Christianity, the English instinct to begloom Sunday, "the instinct in man to grow upward toward the light of his ideals, as a flower toward the sun," the English instinct to hallow Sunday, "the instinct . . . that moves the socialists who have become social reformers to cling to their earlier vision and intone, as of old, their imprecatory psalms," instinct of praise, "an instinct in us tells us that in this way alone (through experience) we come into conscious relation with God," "an instinct for something more sacramental," instinct for the supernatural, and an instinct of theology.

[1] See self-abasement, ethical, fear, recessive, æsthetic, self-assertive, altruistic, family, play, anti-social instincts.

THE RETALIATIVE INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Anger	5	15	15	37
Antagonism, attack	4	3	3	4
Defensive, self-defensive	5	6	6	9
Defiance, contradiction	2	2	2	5
Getting even, retaliation	2	2	2	2
Fight enemies, etc.; vindictive pugnacity	4	4	4	4
Rebel, rebellion, revolt	3	4	4	4
Resentment	2	5	5	8
Resistance, impatience with restraint, struggle	5	4	4	5
Revenge, retribution, "blood demands blood," destroy what injures us	6	10	10	15
Miscellaneous	3	1	1	3
Totals	41	45	47	96

The miscellaneous retaliative instincts are the instincts of the horse to kick, of some foxes to skulk in a circle, and of sheep to stamp. Perhaps the last two are more properly fear instincts. In fact, all three of the miscellaneous instincts are closely related to fear, as are all retaliative responses.

[1] See the anti-social, self-assertive, fear instincts.

THE SELF-ABASEMENT INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Acquiescence, bending	2	2	2	2
Approbation, seek approval	5	4	4	5
Confession, consultation	2	2	2	2
Embarrassment, modesty, shame	3	2	2	5
Following, giving the lead	4	6	6	8
Homage, obeisance	2	1	1	2
Keep out of sight, reticence	2	2	2	2
Negative self-feeling	1	2	2	2
Obedience, obey	4	6	6	6
Sacrifice, self-sacrifice, self-effacement, self-forgetfulness, self-neglecting	6	7	7	10
Self-abasement	1	18	18	46
Self-subjection, self-subordination, secondary rôle	5	7	8	19
Submission, submissive, submit	5	9	9	16
Withdrawal, yield	2	2	2	2
Miscellaneous	9	9	9	12
Totals	53	47	50	139

The miscellaneous self-abasement instincts comprise the following specific types:—an instinct in men to admire what is better and more beautiful than themselves, awe, feminine sex instinct of protection-seeking, restraining instinct, instinct that vowed poverty, instinct for self-torture, peculiar instinct of sorrow, "Oswald's instinct never to 'talk down' to man, woman or child," and "the instinct of women, that they all worship strength in whatever form, and seem to know it to be the child of heaven."

[1] See the recessive, religious, altruistic, gregarious, fear, ethical, and sex instincts.

THE SELF-ASSERTIVE INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Action, active, activity, do things	9	10	10	17
Aggrandizement, ascendency, authority, being a cause, command, control, domination, imperial, imperious, manage, mastery, overcoming, power, rule, supremacy	41	32	35	59
Ambition, careerist, careeristina, success	8	13	13	18
Combat, fighting, pugnacious, pugnacity	18	58	67	294
Competition, competitive, emulation, rivalry	7	20	22	51
Discipline, condemn	2	2	2	2
Egoistic, personality, pride, self, self-feeling, gratification	21	30	30	56
Elation	2	1	1	2
Expansion; persevere; self-advancement, betterment, assertion	11	35	38	85
Freedom, liberty	3	4	5	7
Individualistic, independent, individual rights	4	7	7	18
Leaders, leadership	6	8	8	11
Life, to live, health	8	12	12	15
Preservative, life-preservative	7	7	7	8
Organizing	2	2	2	2
Regulative	1	2	2	2
Self-preservation, maintenance, protection; security	16	66	74	152
Survival	3	2	2	6
Cling to land a little longer and give it one more chance	1	1	1	1
Totals	170	140	161	806

[1] See the retaliative, anti-social, play, sex, food, fear, migratory, religious instincts.

THE SELF-DISPLAY INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Adornment, clothes, dress, ornament	6	6	6	7
Babbling, making sounds, oratory, vocalization	4	4	4	7
Display, display knowledge; self-display	3	15	15	40
Distinction, distinctions, rank	6	7	7	8
Exhibitionist, self-exhibition, showing off	4	6	6	8
Expression, expressive, self-expression	4	9	9	21
Ostentation, for the theatrical	2	3	3	4
Sing, singing	2	2	2	2
Vanity	1	3	3	5
Miscellaneous	5	2	2	5
Totals	37	33	34	107

The miscellaneous self-display instincts are the instincts for appearance and beauty in women and three instincts of the fish: to intensify his pigmented colors through muscular tension, to spread his fins, and to strut before the female.

[1] See the æsthetic, self-assertive, sex, play, and imitative instincts.

THE SEX INSTINCTS [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Amorous, erotic	3	3	3	3
Anadromous, ascend river to breed (salmon)	2	1	1	2
Animal, carnal, physical (implying sex)	4	4	4	6
Antisexual, isolate the sexes	2	2	2	3
Avoid close inbreeding against incest, against marriage of near kin	4	5	5	10
Chastity	2	3	3	4
Continue the race, create offspring, genetic, preservation of species, procreative, propagation, race-perpetuating, race-preservation, reproduction, reproductive, self-perpetuation, spawn	17	45	47	119
Copulation	2	2	2	2
Coquetry, coyness, "flirt in legitimate and decent ways"	3	3	3	3
Courting, courtship, wooing	5	5	5	6
Draws parents to each other, falling in love	3	3	3	3
Female, feminine	2	2	2	2
Fight, struggle for possession of female	2	1	1	2
Repugnance to hybridization, against pairing with individuals of another species	2	2	2	5
Jealousy, sexual jealousy	2	13	13	18
Love, loving, sexual love	10	17	20	53
Lust, passion	3	4	4	5
Male, masculine	2	2	2	2
Marriage among animals, mate, mating, pairing	7	19	20	33
Modesty, sexual modesty, shame	3	4	4	6
Monogamous	4	3	3	5
Philoprogenitive, philoprogenitiveness	2	2	2	4
Purity, female purity	2	1	1	2
Sex, sexual, sexuality	31	99	114	539
Miscellaneous	11	10	10	16
Totals	130	126	147	853

The miscellaneous sexual instincts are recorded as the algolagnic instinct, "the old instinct and fear of the connubium

[1] See the family, play, self-display, self-abasement, altruistic, gregarious instincts.

of patricians and plebeians, of the European nobility and the common people, or of the castes of India," of contrectation, detumescence, exogamy, the gynecocratic instinct, to prevent injurious unions, match-making instinct, Baudelaire's pathological sex instinct, instinct of the desire of possession, and the instinct to see a young woman.

THE INSTINCTS OF WORKMANSHIP [1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Architectonic, architectural	2	2	2	5
Building, construction, constructiveness	20	41	44	103
Tree-climbing	2	1	1	2
Contrivance, tool-using	5	5	6	9
Creation, creative, innovating, planning	5	14	14	17
Devise, do things, experimentation	4	3	3	4
Labor, work	4	2	2	4
Manipulation	1	3	3	7
Mechanical	1	2	2	2
Occupational, professional, craft	5	6	6	8
Spinning	2	2	2	2
Workmanship, craftsmanship	5	27	32	96
Miscellaneous	7	7	7	7
Totals	63	81	89	266

The miscellaneous workmanship instincts are the instinct of an accomplished actor, to economize effort by limiting individual caprice and random experiment, to make beautiful things, teleological instinct, instinct to turn words to profit, to utilize experiments, and to write.

[1] See the intellectual, æsthetic, play, sex, self-display, self-assertive instincts.

MISCELLANEOUS INSTINCTS[1]

Type	No. Classes	No. Authors	No. Books	No. Cases
Climb, climbing	2	3	3	6
Crawling, creeping	2	7	7	10
Diving, diving in birds	2	1	1	2
Grasp, grasping	3	6	6	12
Heliotropic	6	4	4	7
Improvement, onward, progressive	3	2	2	3
Laughing, smiling	2	3	3	5
Locomotion, motor, spontaneous movement	3	3	3	6
Love of sea, sea-lust, thalassophilia	3	2	2	4
Prehension	2	2	2	3
Putting objects into mouth	2	3	3	3
Reaching	2	2	2	8
Run, running	2	3	3	4
Russia, Russian	2	2	2	2
Sitting, sitting up	2	3	3	5
Swallowing	2	2	2	2
Swimming	3	6	6	10
Throwing, throwing things about	3	2	2	3
Walk, walking	2	5	5	8
Miscellaneous	96	46	50	126
Totals	144	62	66	229

The miscellaneous or ungrouped instincts of this classification are as follows: adaptation to change, instinct of the anti-realists, of approach, "an instinct to avoid eating the apples that grew in one's own orchard," "an instinct of being in contact with some strange and unsafe thing," of breaking out of the (chick's) shell, to breathe, bureaucratic, to bury their heads under their wings, burying bones, the dog's instinct of burying his excrement, to choke off discussion, to coil up, for comic situation, cooing, corporalia, craving for space, curio instinct, "to deal with things that had life and movement and significance," to defecate, of desire for results, for

[1] Those instincts which could not be assimilated to any other classification.

doing the wrong thing, of the eternity of life, of a fly-catcher, for following a moving object, of a free people, to get back to nature, to gaze into the fire, to get up in the morning, "the natural instinct of men that are conscious of their dependence on leadership is to give to those that already have," grinding the teeth, gurgling, habitation, Hellenic, of health, holding the head erect, of the Jew driving him "to seek the destruction, in his European environment, of all esteem for tradition, of all devotion for religion, of recognition of any hierachy whatsoever," to insert the fingers into crannies to dislodge small animals hidden there, "Jefferson's instinct to keep the government close to the people," land instinct, local instinct, instinct of the neurones to lose those connections by which neurones "unready to conduct" are stimulated, "the instinct which made the Germans somewhat contemptible in the world of conflicts," mammalian instinct, instinct to move toward the anode, muscle instinct, newspaper instinct, instinct of the notion of hell, of nurture, occult instinct, "the old-world instinct against private contracts with the gods," instinct for out-of-door life, "that popular instinct which evaluates moral, juridical and political innovations in economic terms, if not in actual money," instinct of honest passion, of organization, to perch on boughs, for personification, pointing instinct, instinct of the powers of non-governmental interests, instinct to prefer, "of neurones to preserve those connections by which neurones ready to conduct are stimulated," instinct for public work, of protruding lips, pulling instinct, of pulling to pieces, pushing, of raising the upper lip, blind instinct to realize again the conditions of primitive man, the revolutionary Jew's instinct, Pershing's "instinct as to what was the true rôle of an American commander," of rubbing the eyes, "empiric instinct of rule of thumb," of seizing, of lack of sensibility to social approval or disapproval, settling instinct, Simian instinct, of the sinuous move-

ment of snakes, to sleep with our feet toward the light, somatic, "some sailor's instinct to stretch our sails to every breeze of hope," sounding instinct, of standing, of the Steppe, for striking, the roe's sure-footed instinct, telepathic instinct, to tingle and glow, touching instinct, of a town stroller, "the instinct planted so deeply in human nature for treating with utmost care and at great expense when dead those, who, when alive, have been served with careless parsimony," un-lovelike instinct, of vocalization, weeping, winking, of a woodpecker, to work with the best efforts of the whole personality.

Various problems have arisen in connection with the process of condensing the several classifications which appear in the tables of specific instincts. Some of the classifications condensed easily, very few instincts being left over for the miscellaneous category, or the number of separate groups being small in proportion to the total number of instincts included. Others show either a very large proportion of the constituent instincts in the miscellaneous group or a very large number of constituent groups. The Self-assertion instincts condensed most easily and the Intellectual least easily of all. Perhaps that is what one should expect, remembering that aggression calls for concentration of effort and that thought demands the widest possible receptivity to relevant stimuli. Perhaps in some cases greater condensation would have been possible than was accomplished, as, for example, in the case of the anti-social and gregarious instincts. But there was always present the problem of keeping the constituent groups within the general classifications sufficiently distinct and independent to preserve their identity. It is by no means certain that this aim has been accomplished.

In several cases the question arose as to which general classification certain groups of instincts should be assigned.

This caused no little difficulty, because the general classifications themselves overlap at a number of points. The egoism, egotism, selfishness and war groups were included under the Anti-social classification, when they might also have been grouped under Self-assertion. In fact, some of the ego-instincts are included in both general classifications, the criterion being the meaning of each constituent type as indicated by the contexts. A similar problem arose with respect to the flight instincts. In some cases these belong to the Fear classification and in other cases to some other general classification, but, since such distinctions could not be clearly determined, all flight instincts were listed under the general category of Fear. The secretiveness, shrinking and shyness groups were also included under Fear, instead of being classified as Recessive or Self-abasement instincts. Possibly the instinct of conservation should have gone under the Economic category, instead of with the Recessive instincts.

The number of Ethical instincts found in the literature is relatively small, a fact which probably indicates a fairly widespread recognition that ethical attitudes are more or less thought out and are acquired. The Imitative instincts also constitute a small group. Very few psychologists and social scientists any longer speak of instincts of imitation. The largest single classification of instincts is that pertaining to sex and reproduction. It may seem surprising that this group should have proved to be larger than the food or self-assertion or gregariousness categories. Possibly the sex instincts were so much in the social consciousness of the writers here consulted because sex functioning is more repressed than the functions represented by the other categories with which sex is compared, a fact which would tend to bring it more into social consciousness. Also the so-called sex instincts are more nearly or more frequently genuine instincts than those of any other category or classification.

The propriety of grouping climatic and migratory instincts together may be called in question. The chief justification for doing so is that Jordan and Kellogg, in whose work [1] one-half of all the types and practically one-fourth of all the citations are to be found, make this combination. The self-abasement and recessive instincts are, in many respects, very similar. To some it will appear that both of these groups should be included under the Self-abasement category. However, it is the intention to distinguish between the two groups by including under the Recessive classification all of those so-called instincts which imply inactivity and under the Self-abasement classification those which indicate a feeling of inferiority or self-denial. Similarly, it is not always easy to distinguish clearly between self-assertive and retaliative instincts, for the former classification necessarily includes the latter. It may appear that the whole list of instincts classified as self-display in character might have been distributed to the Self-assertive, Æsthetic, Sex and Play categories. At many points, also, the Workmanship instincts overlap with the Intellectual. On the whole, however, there are probably more points in favor of the classificatory disposition here made of the specific instincts than can be found opposing it.

The results regarding the specific instincts here included and discussed are presented in part in tabular form.

[1] *Animal Life.*

SUMMARY OF THE CLASSIFICATIONS OF SPECIFIC INSTINCTS

Type	No. Classes	No. Authors	No. Books	No. Cases
Æsthetic	51	50	51	152
Altruistic	44	49	56	119
Anti-Social	100	69	75	185
Disgust or Repulsion	39	21	21	74
Economic	60	69	78	281
Ethical	27	35	36	48
Family	83	82	91	413
Fear and Flight	86	52	55	287
Food	64	59	65	228
Gregarious or Social	149	150	172	697
Intellectual	106	80	86	262
Imitative	16	32	34	91
Migratory and Climatic	31	28	29	64
Play	44	57	61	168
Recessive and Repose	26	19	19	36
Religious	30	34	36	83
Retaliative	41	45	47	96
Self-Abasement	53	47	50	139
Self-Assertive	170	140	161	806
Self-Display	37	33	34	107
Sex	130	126	147	853
Workmanship	63	81	89	266
Miscellaneous	144	62	66	229
Grand Totals	1594	323	388	5684

The following table shows the relative frequency of occurrence of the various kinds of instincts as indicated by the classifications adopted. It shows also the relative frequency with which these instincts are used by different authors. It is interesting to note that some of the instincts which occur in large numbers are made use of by relatively few writers, and vice versa. Thus, reduced to percentage bases and comparing the four categories of types, authors, books, and cases, we find some very interesting results, which are rendered sufficiently obvious by the table itself.

COMPARISON OF CATEGORIES IN THE SPECIFIC INSTINCTS

	Comparison of Instincts by Types, Authors, Books and Cases				Comparison of Instincts by Major Classifications			
	Types	Authors	Books	Cases	Types	Authors	Books	Cases
Æsthetic	100	98	100	298	196 (319) [1]	263	268	422
Altruistic	100	111	127	270	165 (275)	258	295	331
Anti-Social	100	69	75	185	385 (625)	363	395	514
Disgust	100	54	54	190	150 (244)	111	111	206
Economic	100	115	130	468	231 (375)	363	411	781
Ethical	100	130	133	178	104 (231)	184	189	133
Family	100	99	110	498	319 (519)	432	479	1147
Fear	100	60	64	334	331 (537)	274	289	797
Food	100	92	101	356	246 (400)	311	342	633
Gregarious	100	101	115	468	573 (931)	789	905	1936
Intellectual	100	75	81	247	408 (662)	421	453	728
Imitative	100	200	212	569	62 (100)	168	179	253
Migratory	100	90	94	206	119 (194)	147	153	178
Play	100	130	134	382	169 (275)	300	321	467
Recessive	100	73	73	138	100 (162)	100	100	100
Religious	100	113	120	277	115 (187)	179	189	231
Retaliative	100	110	115	234	158 (256)	237	247	267
Self-Abasement	100	89	94	262	204 (231)	247	263	386
Self-Assertive	100	82	95	474	654 (1062)	737	847	2239
Self-Display	100	89	92	289	142 (231)	174	179	297
Sex	100	97	113	656	500 (812)	663	774	2369
Workmanship	100	129	141	422	242 (394)	426	468	739
Miscellaneous	100	43	46	159	554 (900)	326	347	636
Grand Totals	100	20	24	357	6131 (9962)	1700	2042	15,789

III. Indefinite and Peculiar Instincts. The nature of these so-called instincts has been sufficiently discussed in Chapter VII to enable the reader to understand that they are not specific instincts, like those classified in the several tables in

[1] The recessive instincts are taken as the index base for the comparison of occurrence frequency in the several categories. But, since the imitative instincts have a smaller number of types than the recessive, the indices of frequency computed from the base of the type occurrence of the imitative instincts are given in parenthesis.

section two above, but are merely characterizations of the qualities or nature or origin of such instincts. Thus we find such terms as acquired, base, inherited, crude, indefinite, natural, fine, primitive, general, specific, instincts among them. By far the larger number of the terms in this third category or general grouping are of this indefinite or qualitative sort. But here also are placed the non-specific peculiar instincts illustrated in Chapter VII. Space does not permit of the presentation of a complete list of these indefinite and peculiar instincts, because of the large number of them. They constitute approximately one-seventh of the total number of types and more than one-seventh of the total occurrences of all instincts. They are found in approximately five-eighths of all the authors and their books. The totals by count, corresponding in form to the tables presented above, are indicated in the table below.

Types	Authors	Books	Cases
843	255	310	2238

IV. Instinctive Attitudes. Under this heading are included all activity or attitudinal processes containing the terms "instinctive" and "instinctively," instead of "instinct." Also included here are the same types of patterns when characterized in the text as native, innate, congenital, inherited, or inherent, when clearly the same thing is meant as if the terms instinctive or instinctively had been used. The list of these terms is very large, running approximately two hundred type written pages. It is, therefore, not possible to publish the findings in respect to this class of terms. The samples given in Chapter VII, must serve to indicate their nature. In character they parallel closely the general groups of instincts and the specific instincts classified and listed in sections one and two of this chapter. On account of the great amount of time neces-

sarily involved in such a procedure no attempt has been made to group these attitudes in classifications paralleling those presented above. It seems, however, judging from a close general acquaintance with their content, that they would distribute numerically in much the same way as the corresponding instincts included in the preceding tables. Since each instinctive attitude or activity process must itself be essentially an instinct under another name, this group of processes might properly have been included in the totals of sections one and two above. But, several conditions, especially that of avoiding a confusing variation in terminology, appeared to justify their classification separately. They are more numerous than the indefinite and peculiar instincts, falling short, with respect to numbers, of the specific instincts only. Their totals, in the form adopted above, are as follows:

Types	Authors	Books	Cases
2474	297	357	3585

It is now possible to make a grand summary of all of the four classes of instincts and instinctive attitudes,[1] true and false, which have been discussed in the preceding portions of this chapter. This summary follows:

GRAND SUMMARY

Type	No. Classes	No. Authors	No. Books	No. Cases
General groups of instincts, totals	849	250	295	2539
Specific instincts, totals	1594	323	388	5684
Indefinite and peculiar instincts, totals	843	255	310	2238
Instinctive totals	2474	297	357	3585
Grand totals	5759	412	495	14,046

[1] A fifth group, including a literary use of the term instinct referred to in Chap. VII, involving the phrase "instinct with . . . ," has been omitted because only approximately one hundred to one hundred fifty cases were found.

CHAPTER X

ORIGINS OF USAGE OF INSTINCT

In the preceding chapters the confusing of acquired habits with instincts in the current literature of the social sciences has been made apparent. In subsequent chapters typical instances of these so-called instincts will be examined in detail and the acquired or learned element in them will be indicated, as a supplement to the general arguments put forth above and in the summary chapter at the end of the volume. In the present chapter an explanation of the origin of the current erroneous and confused terminology with respect to the instincts is attempted.

The present popular and pseudo-scientific view of instincts attributes any activity which is general and widespread in society to inheritance. Even writers of high scientific attainment are apparently victims of the same general confusion. Ellwood, for example, says, "The belief in God and the belief in the immortality of the soul seem especially to have the marks of instinctive beliefs,[1] since in one form or another, they are found among practically all peoples, and we may safely conclude, therefore, that they are an outcome of certain

[1] It may be remarked incidentally that there should be no occasion, from a theological standpoint, of appealing to instinct as a justification of the belief in the existence of God, if belief in revelation as set forth in the Hebrew scriptures remains intact. Possibly a weakening of the theological interpretation of history has, after the manner explained by Comte (*Positive Philosophy*, Bk.VI, ch. 6 ff.) brought the metaphysical interpretation into play, especially among the philosophers. Hence the employment of instinct as a category of explanation. This category is being criticised by those who appeal to scientific analysis in opposition to metaphysical assumptions.

instinctive tendencies of man in interaction with his self-consciousness and reason." [1] By the same token we should speak of belief in a republican form of government as instinctive among the people of the United States and belief in monarchy as instinctive among the German or Austrian peoples,[2] although the facts would seem to indicate that the European peoples lose their "instinct for monarchy" upon coming into

[1] *Sociology in Its Psychological Aspects*, 239. The universality criterion is frequently made use of. McDougall says, "The fact that these religions have gained so wide acceptance shows that they appeal to some universal element of the human mind; while the specially strong appeal of Christianity to the feminine mind, the Catholic cult of the Mother and Infant, and the unmistakably feminine cast of the whole system as compared with Mohammedan and other religions, shows that we are right in identifying this element with the parental, the primarily maternal, instinct." (*Introduction to Social Psychology*, 8th ed., 276.) Woodworth also is inclined to use the universality criterion, but with more or less caution. His method of argument apparently involves a particularly transparent fallacy. He says that it is not probable that sex attraction is an acquired taste, "because the attraction between the sexes is so universal not only among mankind but among birds and mammals and indeed, practically throughout the animal kingdom. Fighting is a similar case. Not so universal as the sex instinct, it still appears almost universally among birds and mammals." (*Psychology*, 97.) Again he says, "The criterion of universality . . . comes down to this: That *when all individuals having the same descent show a trait in common, that trait is to be regarded as belonging to their native constitution—unless evidence can be brought forward to the contrary.*" (*Ibid.*, 98.) But that frequently evidence can be brought forward to the contrary Woodworth admits: "Smoking is universal among the Malay peoples, but we know, as a historical fact, that it was introduced among them after the discovery of America, not very many generations ago. Superstition is universal among some peoples, but we see the superstitious beliefs and practices taught by the older to the younger generation. Similarly with any specific language. It may very well be true in such cases that the universal practice appeals to some native tendency of the people; but the specific practice is handed down by tradition and not by inheritance," (*Ibid*). The fallacy of which Woodworth is guilty in citing the universality of sex attraction as an evidence of its instinctive character consists in giving precedence to the inheritance theory over all other unproved explanations. It illustrates well the dominating prestige of the biological interpretation as a factor discussed at the close of this chapter. In a world, where acquired traits are so much more common, as Woodworth himself says (*Ibid.*, 296), than inherited traits, why should not the assumption, except in purely biological or physiological functions be against inheritance and in favor of habit?

[2] This sentence was written in the spring of 1918. Presumably the German and Austrian governmental instincts have changed since that date without the intervention of the biological processes of hereditary selection!

the environment of the United States. Or, perhaps, the explanation is that certain immigrants migrate because the " monarchical instinct " is not strong in them. Using the universality of a practice as an argument in support of its instinctive character would get us into all sorts of difficulties. On such a ground, we should stop sending missionaries to convert followers of Mohammed, or Buddha, the Shintoists, and others, for the universality of these religions within their territories would show that they are instinctive. Instead of argument and persuasion we should use eugenic methods and breed their religions out of them, unless indeed we hold that the fact that their religion is instinctive is sufficient justification either for leaving their religious views unmolested or for slaughtering the holders of the "instinctive" religions. Such a theory should give great comfort to the advocates of the use of fire and sword as a method of converting the heathen (religious or otherwise), for it would seem to justify the extermination of peoples with supposedly inferior instincts as a more economical and effective method than conversion.

We might even push this obliging interpretation or criterion of the instinctive—the universality of the practice or attitude—to the point of explaining the supposed French addiction to absinthe, the English predilection for "ale," the German delight in beer, the Dutch love of gin, the reputed Italian and Spanish affinity for wines, the Scotch attachment to whiskey and the Irish attitude of tolerance for anything except teetotalism, as instincts characterizing these several peoples. That within historic periods these adaptations to national drinks have been modified and that now a tendency to prohibition is spreading over the western world without the aid of the breeding process to select it in, would not necessarily trouble a resourceful instinctivist. By the same logic it should probably be urged that the Chinese have an instinct for eating birds' nests, the Mediterranean peoples for garlic, the Brah-

minic-worshiping peoples against animal food, the ancient Hopi against turkey, the Hebrews against swine, and the Italians in favor of spaghetti. Why not also speak of the various national forms of greeting, or wedding ceremonies, funeral ceremonies, habits of eating, gesticulating, walking, speaking, or a thousand other practices which are well-nigh universal within the limits of the same nationality, as instinctive? This of course was formerly the method of explanation in common use in accounting for such practices. Whatever practice was general in families or in larger groups was attributed to heredity, in the days when the prevailing notions of the nature of inheritance were crude and when practically nothing was known in a scientific way of social or environmental transmission through imitation. The oriental's interest in speculative religion and philosophy and magic and the western practical predilection for science have been accounted for as instinctive, especially in the days before oriental peoples began to take over western science and while our historic memories were yet poor with regard to the scholasticism of the west in the middle ages and with respect to the curricula of our more modern universities and colleges addicted to classical education. It is but recently that the Mendelian and Weismannian theories have made untenable a wholesale application of the universality argument by demonstrating that inheritance is by unit characters and does not apply, in any great degree at least, to acquired characters. As yet, however, the far-reaching significance of these theories for the theory of the instincts has not been very generally recognized, not even by the biologists and the near-biologists—the behaviorists—themselves.

Of course it may be objected by the defenders of the free use of instinct that these cases go too far afield; that the supposed instinctive belief in God,[1] for example, has a much bet-

[1] This particular belief is selected merely at random for convenience of discussion. A hundred other examples might have been used as appropriately.

ter basis than the popularly, if erroneously, reputed instinctive tendencies of the French to drink absinthe, to embrace each other in greeting and to produce pornographic literature. In the first place it may be contended that all peoples believe in God, or at least in gods, and in the immortality of the soul. This, however, is not quite true. A more accurate statement is that all peoples, except possibly some rationalists in all relatively late epochs, the number of whom has increased in very recent times, appear to have had some attitude toward the supernatural, even if, according to some of the anthropologists and psychologists of religion, they create their own divinities.[1] But the content of this belief varies greatly from people to people, and from age to age. Early peoples in the pre-animistic stages of religious development did not believe in gods, much less in God. They had the most crude and as yet undifferentiated attitudes toward natural forces or powers which they pictured as fetiches, or spirits or even more crudely still. Only more recently do these spirits develop into the true personalities of polytheistic divinities, and still later are the personalities merged into something like monotheistic deities.[2]

In like manner also the concept of the after life appears to have grown up gradually, perhaps not being at all apparent, or at least appearing exceedingly indefinite and amorphous, among the most primitive peoples, becoming stronger among the higher savages, very marked among most barbarian and early civilized people addicted to ancestor worship, and apparently tending again to weaken or disappear among many peoples who think in a scientific instead of in a theological

[1] See I. King, *The Development of Religion*, especially ch. 9. This theory that men create their divinities in their own images as the result of purely natural and easily explainable psychological processes is, of course, as old as the history of scientific thinking. We find it even in Lucretius and Vico, to say nothing of more recent writers.

[2] See L. L. Bernard, "Religion and Theology," *The Monist*, Jan., 1922.

terminology.[1] In all of these variational types of belief in the supernatural or in the theological hereafter, quite different neural correlations or structures are involved. Since only physical or biological structures, and not ideas apart from neural structures, can be inherited, the nature or content and form of the inheritance would necessarily differ according to each different mode of belief. This would, consequently, necessitate a separate instinct for each type of religious belief, a supposition which reduces to the same sort of absurdity as the hypothesis of instinctive adaptations to national drinks, foods, costumes and the like. Since man's religious beliefs have changed markedly within historic times—a period much too brief for the reforming of his instincts by means of selection through inheritance—it must be quite patent that these beliefs are matters of tradition and custom rather than of instinct.

But, if there is not an instinct of belief in God, may there not be some other instinct which leads man necessarily to develop by the help of his reason, as Ellwood says, a belief in God? Aristotle speaks of an inborn tendency of some people to be masters and of others to be slaves; [2] and present day psychologists and sociologists refer to an instinct of self-abasement.[3] If there is such an instinct may not this inherited feeling or attitude of man, that he is unequal to the tasks and problems of the world in which he lives, constitute a basis upon which he constructs the idea of a divine or supernatural power and comes to believe in that idea as a reality? Doubtless many would hold that such is the origin of the idea of su-

[1] See James H. Leuba, *The Belief in God and Immortality*, esp. 250–281. The findings summarized in this volume support the contention made above. See early chapters of this work for illustrations of changes in character and content of beliefs with advance in culture.

[2] *Politics*, Bk. I, ch. 5.

[3] See W. McDougall, *Introduction to Social Psychology*, chs. III and XIII.

pernatural agents, a stop-gap explanation of a great moral and physical mystery—the physical mystery of how things came to be and the moral mystery of how they could be as they are in human relationships—compelling the hypothesis of a mysterious and all-wise purpose beyond the powers of man's intellect to unravel and indicating faith as the necessary refuge from a destructive belief in an anarchistic or malevolent universe.

Whether such a hypothesis of the origin of the belief in supernatural powers is true or untrue is no task of this work to decide. It is stated here as a possible alternative to the view earlier put forth to the effect that belief in God is a true instinct, a unit character in itself. The question which concerns us at this point, as an aid to accounting for men's belief in God, is whether this attitude of self-abasement, this feeling of inability to cope unaided with the problems of life and death, is inherited or is acquired from man's experience; whether it is an instinct or an acquired habit complex due to experience with the difficulties of adjustment one inevitably encounters in this world. The latter would seem to be the more credible explanation. If we assume the inheritance of such an attitude we must face the logical fact of assuming the inheritance of the neural correlate or disposition or "set" which corresponds to this attitude. But such a neural correlate is not a fixed or unitary organization which can be inherited as a unit character. It varies according to its object, or the cause of the difficulty before which the human spirit bows down. In the case of humility before a hated monarch, for example, the neural disposition or content must be very different from what it is in the case of humility before the fact of a disappointing career. In other words, humility is a class term, an abstraction. There are humilities or self-abasements, but no humility or self-abasement in general from a concrete neurological standpoint. Consequently, it is a mistake to speak of the inheritance of

humility or of an attitude of self-abasement as an instinct. Such general inheritance is an impossibility.

On the other hand, if we speak of the inheritance of separate instincts of self-abasement, each being characterized by the object toward which it is directed—God, parents, kings, the police, among others—we are back upon the other horn of the dilemma, a belief in God which is a true instinct. This view we were earlier forced to reject because of the difficulties which it presented to us. Our only alternative, therefore, is to explain the attitude of self-abasement as a habit complex developed out of a multifold experience of the hardships of life on the one hand and of the superiority of other beings, including God, on the other hand. This would tend to explain why the attitude is more prominent in some than in others, and in the same person at one time than at another. It varies according to the difficulties which one has experienced in adjustment, difficulties arising both out of the external environment and out of the personal health, native powers and requirements of the individual making the adjustments.[1] It is a fact of common observation that the poor and the ignorant and the oppressed have everywhere and at all times been most superstitious, or, in the popular and less discriminating sense of the term, most religious.

In either case we are driven from the hypothesis of an instinctive belief in God or in immortality.[2] Yet we might well

[1] Leuba, in the work above cited, gives concrete instances which support this statement. See, for example, p. 235.

[2] See I. King, *The Development of Religion*, 26, 36, 339. He says, "To hold that religion is an instinct, or that it develops from an instinct, can mean only that it is some physiological adjustment to the environment necessitated by the life-process or, possibly, that it is some conscious attitude aroused by the failure of such an adjustment to function properly. In either case, however, we are involved in a serious confusion. In no intelligible way can the religious consciousness or religious acts be thought of as directly related to the biological struggle for existence. If religion is to be called an instinct, it would certainly necessitate a new definition of instinct. As was suggested in a foregoing paragraph, however, the real thought which those writers who have described reli-

consider that as strong a case can be made out for an instinctive belief in God on the universality hypothesis as for any belief or social practice or attitude. That is why this particular "instinct" has been taken for analysis and illustration. Shall we not, therefore, have to seek another explanation than that of heredity for universal practices? Such a substitute explanation would not appear to be difficult to find. Any practice which can be acquired can be made universal if the proper environmental conditions for stamping in or inducing the practice exist. The form of the family, the beliefs about the cause, cure and prevention of disease, attitudes with respect to property ownership, are but a few examples among countless numbers of attitudes and practices which have grown up because of their survival value under favorable environmental conditions. These attitudes and practices have tended to universalize themselves for the same reason that they appeared in the first place. We may expect any of these to undergo further modification under varying environmental pressures, understanding by environment the psycho-social environment quite as much as the biological and anthropogeographical environments. In the face of such facts we cannot consistently speak of the universality of a fact as being in itself conclusive evidence of its inherited or instinctive character. We must use

---

gion as an instinct have meant to convey is that religion is something original, or innate, in man. The use of the term offers, under a thin disguise of science, a point of view that is utterly opposed to all that is scientific. The scientist cannot be satisfied to regard anything as innate. His so-called ultimate data are ultimate only for the philosopher or for the non-scientific mind. The 'instinct theory' really belongs to the philosophy rather than to the psychology of religion. . . . The religious consciousness is, then, first of all an attitude rather than an instinct. . . . Our point of view in these studies has continually been that the religious attitude is a fairly determinable psychological complex which has been built up in the course of the life-process and which, therefore, bears a definite relation to the physical and social environment within which it has taken shape. Since it is thus a psychical complex rather than an elementary instinct, it is not necessarily always present as a definite attitude in a given individual, and it is further quite conceivable that in some persons it may never be clearly organized at all."

other criteria for determining the nature or identity of the instincts.

An equally prolific, and certainly a more excusable source of the current misconceptions regarding the nature of instinct, is to be found in the survival of the old uncritical notions regarding the nature of heredity already referred to. Formerly it was supposed that any characteristic with which people were born was inherited. Before the development of the theories of Mendel and Weismann there were no data for correcting this erroneous impression. Although these facts now exist, many of those who received their training in the theory of heredity before these later discoveries became current in our thinking have not since revised their notions in regard to these fundamental principles of inheritance.[1] Others, like the workers in the social sciences, who get their knowledge of biology at second hand and often from traditional sources, have not yet come to apply consistently the principles of Mendelism and Weismannism to their own subjects. While they accept the conclusions of these men generally and in principle, they find it difficult to revise their theories with reference to the concrete facts of the new science. Even some very reputable

[1] An interesting example of this continuance of the old usage by one who is conversant with the new facts is to be found in the definition of heredity taken from a semi-popular work by a biologist who discusses the Mendelian theory in the same work. "By heredity is meant the degree of likeness between parents and their offspring. Originally the term implied succession in tenure, but as in the case of so many scientific words, the original significance has been altered and the alteration established by custom. In its modern sense heredity is a measure of the resemblance between two or more generations of the same family."—F. W. Gamble, *The Animal World*, 230. Although the author recognizes alteration of the original significance of the term, such alteration apparently has not entered into his own thinking as a result of the newer theories appearing since his own early training was received. Councilman, *Disease and Its Causes*, p. 197, also says, "By heredity is understood the transference of similar characteristics from one generation of organisms to another [presumably ascending]." See also W. M. Feldman, *Principles of Ante-Natal and Post-Natal Child Physiology*, 11.

physicians and embryologists and engenicists still speak of diseases which are due to germ infections and of bodily and mental conditions originating in the prenatal conditions of the development of the child as inherited.[1]

This looseness in speaking of the inheritance of physical and neural traits carries over to mental and moral and social characteristics as well. Inheritance being conceived of as such an indefinite and general process, it does not appear to the uncritical thinker that any violence is done to logic in speaking of the inheritance of any trait which can be established as common to both parent and child. This faulty reasoning gives rise to the *post hoc, propter hoc* or associational error of attributing a hereditary or instinctive origin to traits. Hitherto, and for that matter, even yet, for the great majority of writers on the instincts, the fact of the coexistence of traits in the line of descent has been assumed as sufficient to establish their hereditary nature and origin. Thus, if both parent and child were alcoholic, the fact was regarded as establishing the inheritance of an impulse or instinct to drink intoxicants. In the same way we have uncritically explained the appearance of various types of immorality, ability, religious and political attitudes, in fact, of practically all of the social and moral attitudes and intellectual proclivities in the offspring of people who themselves possessed these traits. This tendency still persists, although somewhat diminished in repute, in spite of a growing analysis and exposition of the methods by means of which such attitudes and practices are acquired.

This naïve method of reasoning in regard to inheritance has been used by practically all the writers on eugenics. Davenport, in constructing his elaborate list of inherited tendencies or adaptations, and Pearson, in his various studies of hereditary traits among special groups, have not gone beyond the statistical method in studying heredity. These writers and

[1] See, for example, S. J. Holmes, *The Trend of the Race*, 67, 166, 307.

their assistants have collected and counted cases of correspondence of traits in parent and child among selected groups and then have assumed—not proven—a hereditary relation between them. In other words, they have not vitalized the Mendelian theory of inheritance by taking the trouble to establish the existence of the supposedly inherited trait as a unit character. Nor have they sufficiently respected the doctrine of the non-inheritance of acquired characters of Weismann by taking care always to show how traits—in particular, social and moral traits of recent origin—could have appeared as unit characters at so late a date, when they had not previously existed in the race and when, moreover, some of them would probably have destroyed the race if they had existed as definite hereditary traits of which all offspring were likely to become possessed through biological inheritance. To seek refuge in the assumption that highly complex moral and social technique may be explained as mutations is really going beyond the realm of the probable, even in eugenics thinking, which is said to open up to us a new world of possibilities in human improvement.

This assumption, that traits are inherited because they appear in both parent and child, has been given more currency than would otherwise be the case, because of the general lack of appreciation of the methods of environmental control. The science of environment is just beginning to be developed.[1] Some sort of knowledge of heredity, though of course pseudo-scientific in the main, has existed from very early times. Men, since the development of pastoral industry, have been breeders

[1] For beginnings in the science of environment see L. J. Henderson, *The Fitness of the Environment;* G. R. Davies, *Social Environment;* E. A. Ross, *Social Psychology;* E. C. Semple, *Influence of Geographic Environment;* and Lester F. Ward, *Applied Sociology*, and the works of Bagehot, Tarde, Ross and Cooley, among more recent writers on this subject. See also paper by the writer in *Publications of the American Sociological Society*, 1921.

of animals. This practice of controlling reproduction grew in time into an art and more recently into a science. The easily observable fact that colors, textures, shapes and other physical factors are regularly transmissible has familiarized man from remote times with the great outline methods of inheritance. In fact, but little that was new was added to the very early theory until near the end of the nineteenth century. In the absence of a detailed knowledge of environmental controls it has been inevitable that it should be supposed that mental, moral and social traits are transmissible in the same way as are the biological. The fact that such traits do generally follow the line of descent from parent to child, thus apparently paralleling biological inheritance, has constituted an exceedingly strong presumption for the inheritance of such traits. The fact that these moral and social traits may be transmitted laterally, that is, contemporaneously from group to group and from person to person regardless of blood relationship, age or condition, has become strikingly apparent only as we have developed a science of environmental controls and pressures, and especially since we have developed modern group life with a great diversity of traits which are constantly being mixed and fused through suggestion and imitation. As long as group life was homogeneous, as was largely the case in earlier times, before there was much mixture of distant cultures and the diffusion of knowledge and suggestion over wide areas, it was not possible to observe this lateral transmission in marked degree.

The science of environment has itself developed slowly because of its necessarily abstract character. The main surface facts of animal breeding, including the transmission in general of physical traits, are concrete enough to be observed and understood in broad outline by every one, and they are known to peoples of fairly low culture. But the facts of lateral or social transmission of traits have not generally been so easily

observed. Until recently the home and the immediate community life have been practically the only institutions engaged in rapidly shaping moral and social traits. The problem has been complicated by the fact that these institutions have also been blood relationship groups, thus affording a most excellent basis for confusion of the hereditary and the educational or environmental origin of characteristics. Also, the mechanism of the social transmission of traits has not been well understood. There is still much discussion in regard to the relative merits of imitation and instinct in the learning process. To be sure, some of the methods of sympathetic magic early presupposed a lateral transmission of characters, but the methods attributed to this magical transmission were supernatural rather than natural and psychological or physical. It is only recently that we have reduced the methods of magic to the psychology of suggestion; and not every one has as yet become convinced of the validity of this substitute explanation. We have developed a psychology of imitation only comparatively recently, and the fact that imitation is psychological, or invisible, and abstract, while inheritance is biological and more concrete and visible, has doubtless been a matter of considerable determinative importance in the delayed development of an understanding of environmental controls.

The science of environment has developed rapidly under the fostering influence of the later scientific equipment for measuring differences in environmental pressures and methods of calculating the effects and relations of these. Thus we have developed the sciences of anthropogeography, ethnography, plant ecology, economic zoölogy, meteorology, and the like, in the physico-biological realms of phenomena. With the passage of education from the status of a primitive art into a modern science, and with the development of modern methods of re-educating offenders, the retarded and the psychoneurotic, we have developed the science of environment in ap-

plication to the production of mental, moral and social traits. With the development of institutions and organizations for reforming character and for controlling instruction in groups of a non-consanguineous character—which in fact have cut across the old consanguineous groupings—we have been able to distinguish the sources of character to a better advantage than was possible in the family or the consanguineous community. At the same time we are working out, with the aid of applied psychology, the mechanics or technique of the transmission of characteristics by social and psychical means. With this growth of a science of environmental controls we are coming to revise our cruder notions of the applicability of the theory of heredity to all sorts of transmission and control processes. Consequently we are revising our old theories of the instincts, which are inherited traits. At the same time we are substituting explanations in the terminology of social transmission for explanations in the terminology of hereditary transmission. An interesting illustration of the effect of the earlier establishment of the inheritance view of the acquisition of characters, which we are accustomed to speak of simply as heredity, is to be found in the fact that the term social heredity is still so generally applied, by analogy with biological inheritance, to the process of environmental transmission. It would be much better to leave the term heredity to be applied to biological transmission only, that is, to those traits which come down through the chromosomes and which are fixed at the point of fertilization. But such is the dominance of our biological modes of thinking that we borrow the term heredity from the description of the well-known biological mechanisms of transmission to be applied by analogy to the little known process of environmental transmission. We should simply speak of environmental or cultural transmission to cover this latter fact, instead of using the phrase social heredity.

Another source of error in the current views regarding instinct is the failure of so many writers sufficiently to take into account the fact that heredity is strictly a biological process. There is no such thing as the inheritance of mental attitudes, ideas, moral qualities, social traits, beliefs, and the like, apart from the biological structures upon which they are based. The old dictum, "no psychosis without neurosis," is entirely sanctioned by modern experimental psychology. In the matter of the inheritance of biological traits there is no great difficulty in making a consistent correlation between terminology and facts. But in the matter of the supposed inheritance of mental and moral and social traits a very great difficulty arises for the writer who is accustomed to make extensive use of the terminology of the instincts. To speak of the inheritance of a moral or social trait, such as truth-telling or pauperism or criminality,[1] is meaningless, unless one is willing to assume the inheritance of the corresponding biological structures. The biological structure which corresponds to a mental or moral trait is, as was shown in an earlier chapter, primarily neural, and it is generally spoken of as the neural correlate. At first thought it might appear to be a simple enough matter to assume the inheritance of the neural correlate of a moral or social trait as a unit character. But such is not the case. As already intimated in this chapter, such traits are abstractions. They are terms used to describe a group of similar or related reactions. They are not, on the neural side, fixed and unitary processes. Each separate act of truth-telling, for example, may differ very widely in the neural organization back of it from that back of another act of truth-telling. If I tell the truth about the German theory of militarism I shall perform neurally quite a different act from that involved in telling the truth about Greek mythology. Besides, what is truth re-

[1] For examples of such usage see Ellwood, *op cit.*, 223 and C. B. Davenport, *Heredity in Relation to Eugenics*, 80, 83.

garding these matters in one situation or at one time may be false at another time or in some other situation. Or, to put it more positively, what is truth under one condition and in one relationship may be falsehood in another relationship and under other conditions. Yet the neural processes and organization may be identical in the two cases. The same is true whether my truth-telling is about the fallen cherry tree or the missing watermelon. Morally and abstractly the acts can be classified together, but, neurally, not necessarily so.

How then can we speak of the inheritance of an instinct for truth-telling? That is a moral term which means different things neurologically under different circumstances. Obviously, therefore, truth-telling is not a unit character, from the standpoint of biological heredity, whatever degree of unity there may be to it abstractly and morally considered. We might, of course, speak of each act of truth-telling as being in itself a unit character biologically, as for example, telling the truth about the cat, telling the truth about John, etc. But even these cases would have to be broken up and classified under the minute circumstances in which each act of telling the truth occurs. To speak of instincts in such a sense as that would be meaningless, for such acts, identical in nature neurologically, would probably never be repeated, either in the experience of the same individual or in that of his offspring. They are not typical of the experiences of the race and therefore could not have been selected into the inheritance process as instincts. That is, the conditions of telling the truth about the cat and about John and Mary, now that we have small apartment-house back yards and movies and automobiles, are not the same as they were in early times. And the cat and John and Mary are not the same. Hence, there is lacking that phylogenetic continuity so necessary to the evolution of instincts, but not of ideas and abstract values.

A similar source of error is to be found in the common failure to recognize that the moral or social character of an act is dependent upon external or social circumstances and evaluations rather than upon the neural content of the act. Thus the same act of shooting a dog may be highly moral under one set of social circumstances and highly immoral or anti-social under another set. Being strongly sexed was a valuable trait, socially speaking, among colonists settling a new country, because of the value placed upon offspring. But such a trait may lead to acts which are regarded both as immoral and as socially injurious in an over-stocked population. Much study into the history of a sacred literature is judged to have good or bad effects, and is therefore considered to be socially desirable or undesirable, according to the state of public opinion. In different places and times it is rewarded accordingly. The same act varies greatly in moral and social values from place to place and from age to age. If we suppose, therefore, that we inherit the mechanism for this act (leaving the question of the physical possibility of such inheritance aside), do we thereby establish the inheritance of any variable moral or social trait based upon the act? Such does not necessarily follow, for the social or moral attribute of the act shifts or varies with reference to the act itself as much as the act varies with reference to the moral and social qualities. One does not inherit a criminal trait if (supposedly) he inherits an instinct to kill dogs or even merely an instinct to kill. The social and moral quality is determined by the valuations which function in environment and is relative to circumstances. Killing dogs may or may not have moral implications, according to the social values of the act, even though the physical character of the act may remain the same, when the values differ. Whether the biological structure or mechanism of an act so general and purposive as the ones mentioned above may itself be inherited will be discussed in a later chapter.

If one undertakes to analyze such "instincts" as predominate in the lists of the preceding chapter into their underlying structural or neural equivalents and then observes the shifting character of the structure in relation to the abstract or evaluational content, the lack of both a logical and a biological justification for classifying these acts as instinctive becomes apparent. Until such an analysis is undertaken it will be difficult to make completely clear the error of this usage.

Another source of the current erroneous usage of instinct is to be found in the old doctrine of natural rights. This theory is an ancient one, but it had a remarkable expansion in the eighteenth and nineteenth centuries, when it came to be used as a justification for revolt against the inequitable established order of the times. The first great battles of modern democracy were fought on the philosophic basis of the theory of natural rights.[1] The artificial social order which piled up privileges for the classes and exercised tyranny over the masses in the name of some externalized shibboleth, such as the divine right of kings, or the four fundamental relationships of Aristotle,[2] was opposed by an equally externalized plea that man, the masses of men, were endowed with certain rights, such as life, liberty and the pursuit of happiness, which proceeded from the nature of things, that is, from natural law. Thus the metaphysical doctrine of natural law was invoked in defense of democracy against the theological doctrine of divine right of the classes. Both of these appeals were, in their nature, to abstract metaphysical concepts, and their defenders had in time to render them concrete and demonstrable or acknowledge logical defeat. The natural rights doctrine has found its concrete equivalent in the theory of instincts. It is now man's

[1] Earlier struggles for democracy were justified on a theological basis. See Louis Wallis, *Sociological Study of the Bible.*

[2] *Politics*, Bk. I.

nature, human nature, rather than natural rights bestowed from an external natural order, which justifies the democratic masses in resisting governmental absolutism when it serves a privileged order. Similarly, in the economic sphere, there is rising up a protest, also in the name of instinct, against the dominant industrial order.[1] This newer brand of psychological and sociological economists repudiate with telling criticism the old intellectualistic concept of the "economic man," so long used as the bulwark of reaction and privilege. But in their haste they rush to the opposite extreme and embrace another absolute, the "biological man" or "instinctive man." They largely ignore the great middle ground of learned adaptation, of custom and tradition and convention, in whose relative and shifting content the preponderating mass of human action and social truth lies.

The general theory of natural law, or metaphysical essences, underlying the theory of natural rights, has itself been one of the most effective and potent sources of the modern instinctive theory of behavior. But it is connected with present usage indirectly rather than directly and therefore is not commonly recognized as such a source. According to this theory of natural law, which was in good standing even well into the nineteenth century,—but especially during the middle ages and early modern times,—certain essential principles or forces dominated all action and existed as the basic and dominating principle in all organization, cosmic and human. It was natural law which held the universe together, which kept the

[1] See the highly significant paper of C. H. Parker, "The Motives in Economic Life," in *Publications of the American Sociological Society*, Vol. XII. The author of this paper has attempted to list and classify the human instincts which are, in their insistent demand for satisfaction, destined to overturn the established economic order, unless it takes account of instinctive human nature. See also Taussig, *Inventors and Money-makers* and Wallas, *The Great Society*. Helen Marot's *Creative Impulse in Industry* and Ordway Tead's *Instincts in Industry* develop a similar theory, and the doctrines of psychoanalysis are based upon cognate assumptions.

sun and planets and the stars in their courses. And this was one with the *nous* or universal order and intelligence of the Greeks, the "tao" of the Chinese Taoists, the universal reason of the stoics, the divine harmony of the middle ages, the pantheistic principle of the metaphysical theologians of the less recent modern times and the Nature of the Physiocrats and the force that made for progress of the Age of Enlightenment and the principle which makes for righteousness or good in the universe in the faith of Matthew Arnold. This principle or essence which dominated the universe and kept it in order also manifested itself in the individual as reason or as conscience. It was the violation of this principle which produced the remorse which William Morris believed was the most effective preventive of wrongdoing.[1] From it also sprang the natural propensities made so much of in the metaphysical theories of society set forth by such men as Fourier and the anarchists. It is likewise, though more distantly, the forerunner of and logical sanction for the theory of instincts, made emphatic by the Scotch metaphysicians of the late eighteenth and early nineteenth centuries and by the modern Scotch school of metaphysical psychology. The doctrine of instinct, along with vitalism and the theory of innate conscience or knowledge of moral values, to say nothing of the doctrine of a metaphysical soul and of mental and spiritual powers and propensities, auras and ectoplasms, advocated by the mystics and the mystified, is a surviving aspect of the doctrine of innate essences which control individual action and social adjustment. While there are of course inherited action patterns, of more or less definiteness of structure, the still dominant concept of instinct—of inherited values and abstract essential powers—set forth in the citations of the previous chapters is essentially metaphysical and carries on the spirit and tradition of natural law.

[1] *News From Nowhere*, 114.

In all the concerns of society and social thinking we view the same general tendency of a movement away from the metaphysical, and therefore no longer tenable, doctrine of natural rights over to the more concrete, and at present more popular, theory of instinct as a basic defense of democratic aspirations. In this movement we see a shifting of terminology, though scarcely a shifting of fact. The natural rights concept is merely brought down to earth and its sanction is transferred from the vague "nature of things" to the relatively concrete "human nature." The name also is changed and instead of "natural rights" we have "instinctive needs." The general term "human nature" has itself been broken up into countless "instincts," typical representatives of which are presented in the preceding chapter. On the other hand, and in a very similar manner, the forces of economic and political reaction have followed parallel tactics. They have, except in a few isolated instances, given up the claim to justification on theological grounds [1] and have turned to a metaphysical justification in the form of natural rights. Property now defends itself with the legally sanctioned natural right of freedom of contract, which has been appealed to in our courts with excessive frequency in the last decade. Strange as it may seem, the conservatives and the privileged have stolen the thunder of the radicals of the fourth estate, and natural rights, once the defense of democracy, is now the bulwark of conservatism.[2] But this has occurred only as the radicals are abandoning the metaphysical doctrine of natural rights [3] for the apparently more scientific doctrine of human

[1] Mr. Baer, one of the anthracite coal mine operators, is said to have defended his refusal some years ago to arbitrate the demands of the miners on the ground that the operators held their possessions in the form of a trust from God. Also the German emperor is reported to have claimed a similar alliance for himself.

[2] See E. Barker, *Political Thought in England from Spencer to Today*, 120, 248.

[3] Some of the equal suffragists were quoted as arguing still for the vote for women on the grounds of natural rights when the nineteenth amendment passed, apparently unaware that times have changed in the world of philosophy.

nature and the instincts, its lineal descendant in the evolution of terminology. But even here the radicals are being hard pressed, for even instinct or human nature is now being appealed to in behalf of class distinctions and is being used to justify social and political inequality, including many of the economic distinctions of the existing industrial system.[1] The time is already at hand when the defenders of democracy and the opponents of special privilege will have to turn from the predominantly biological or instinct justification to one based on social analysis and imbedded in social needs. The justifications of social programs in the future will not be primarily individualistic, whatever may be the philosophy underlying the individualism in question, but they will be based upon the demands of a rationally and scientifically organized society.

To these origins should, perhaps, be added a more general source of the current usage of instinct, the dominance of the biological method of interpretation in recent times. Since the work of Darwin and his brilliant contemporaries and successors in the field of biology, the methods of this science have been in the ascendency, and its interpretations have been assimilated as far as possible by the other sciences, especially the newer ones, which have not yet achieved a sufficient standing of their own as efficient methods of interpretation. This fact of the ascendency of some one science in the thinking of men engaged in the solution of problems is to be expected, because it is in keeping with the principles of social suggestion. It has always been true that the science

[1] See W. Bateson, *Biological Fact and the Structure of Society;* also C. B. Davenport, *op. cit.* It is scarcely necessary to mention in this connection the extreme and erratic views of Nietzsche, which condemn democracy in the most unequivocal terms on biological grounds. Professor F. H. Giddings, *Studies in the Theory of Human Society*, 244 ff., appears to take a position almost as little complimentary to the equalitarian aspirations of the masses of mankind.

or discipline or set of beliefs which has for one reason or another, including degree of perfection of technique, achieved great prestige with thinking people becomes at that time a sort of model for the imitation of other sciences, disciplines or beliefs. The Aristotelian logic, which had supplanted the largely magical and mystical methods of interpretation previously dominant, held sway until the methods of experimentation advocated by Roger Bacon and put into practice by himself and his successors had in turn taken precedence. With the rise of the experimental and quantitative methods of observation and measuring, the methods of physics and chemistry for a long period of time held sway over thinking minds with scientific interests. This was because the physical sciences developed first, their subject-matter being more in the attention of man and their phenomena being subject to simpler correlations. Even as late as the first writings of Herbert Spencer this great philosopher, who might properly be called the scientific weather vane of the nineteenth century, was under the dominating influence of the methods of the physical sciences.

It was the doctrine of evolution which attracted the attention of the intellectual public and of the scientists to the methods of biology. This doctrine opened up a new view of the whole world of life and it was soon perceived that its general methods and principles could be applied to the vast fields of social phenomena, such as religion, government, industry, domestic institutions and many others. It took the scientific world by storm. But its triumph was not by any means ungrudged or undisputed. All of those forces and interests which were tied up with a static interpretation of life and society, with a quick intuition for the dangers which assailed them, began merciless warfare upon this new theory. The ossified forms of ecclesiasticism, the nobility which rested upon tradition and privilege, inherited wealth, the classicists,

the defenders of the scholastic viewpoint everywhere, generally and for the most part were hostile. This opposition was an immediate and effective challenge to the defenders of the theory. They responded with numerous detailed and painstaking investigations in its defense, emulating the patient thoroughness and devotion of Darwin himself in their zeal. Soon they had a body of data and a wealth of interpretation which was the wonder of modern science. No other recent science could compare with the showing and technique of biology. All of the other sciences had lent their aid and had made their supporting contributions. Each was skewed or distorted in the general direction of biology. Geology developed largely the aspects of paleobotany and the paleontology of animal life. Chemistry emphasized the carbon compounds and split off the new division of organic chemistry. Geography became dominantly the study of the distribution of races and animal and plant forms, verging largely toward its economic aspects. Psychology developed the experimental method and plunged into the fields of physiological and comparative psychology and the sciences of biophysics and biochemistry, which came on the scene in the eighteen hundred nineties. Anthropology for a long time dominated sociology, religion, ethics, jurisprudence and history,—in fact all of the social sciences and disciplines. The science of eugenics was invented and developed, at first under the dominance of the theory of the inheritance of acquired characters and later under the discipline of the biological theories of Weismann and Mendel.

It is largely through this biological channel, of eugenics on the one hand and of comparative psychology on the other hand, that the instinct interpretation of conduct makes specific connection with the dominant biological interpretation and method. It makes its more general connection through the prestige of that method. The modern scientific mind has

come to think primarily in terms of inheritance where human action or animal life is concerned. It would be very surprising if the sociologist and the social psychologist had not, largely unconsciously, but also at times quite consciously and purposively, come under the spell of the biological prestige. Only those sociologists who have collected data and observed social processes for themselves, instead of depending primarily upon biology and other antecedent sciences for their subject-matter and ideas, have come to realize the competing influence of environment as a dominant sociological factor.

No one of the factors discussed in this chapter is individually and solely responsible for, or constitutes an accepted historic or logical justification of, the current usage of instinct in the minds of those who employ the term so loosely and with such frequency. The more popular writers, as well as many of the more scientific ones, have not, of course, troubled themselves about a justification. They have more or less unconsciously adopted present usage, without taking the trouble to examine the merits of the question. They have not thought out and digested the theory of instinct. At the most they have accepted the theories of McDougall or some other writer as a convenient support to their practice, and perhaps have attempted to employ the treatises of such men to give order and system to their own usage. This fact is particularly well illustrated by the usage of the instinct concept by the psychoanalysts.[1] These writers have perhaps been more especially under the influence of the recent biological prestige. But all factors have contributed directly or indirectly to predispose toward the present practice of employing the instinct interpretation of human conduct in social situations,

[1] See Bernard, "Instinct and the Psychoanalysts," *Journal of Abnormal Psychology and Social Psychology*, Jan.–Mar., 1923.

or to the justification of such usage when it is employed. This usage can be corrected only by making clear its origins on the one hand and by displaying the weaknesses of the theory from a scientific and critical standpoint on the other. A more scientific method of social interpretation is possible only in so far as we can work out and present its details. This is attempted in the later chapters of this book.

CHAPTER XI

HEREDITY AND THE INSTINCTS

In the foregoing discussion a certain definite relationship between instinct and inheritance has been assumed. This assumption is justified because the accepted definition of instinct describes it as a definite inherited stimulus-response process. Yet to many, perhaps, it may seem that there is an appreciable distinction between an instinct and an inherited trait or unit character. If there is such a distinction it should be possible to define it. To those who accept the Mendelian hypothesis of heredity it is an approved principle that the method of inheritance is by means of unit characters. That is to say, we inherit specific structures, and not merely general qualities. Whether it be eye color, texture of skin, shade of hair, stature, or color blindness, it is a definite thing which we inherit.

What is said here of the inheritance of organs and structures, or unit characters, is also true with regard to the inheritance of instincts. Here the inheritance is of definite, definable groupings of traits, that is, of neural organization. Moreover, this inheritance is always structural, that is, of some physical or biological organization, not of abstract relations or values. To be sure we are accustomed to describe the instincts in a somewhat different way from that in which we describe the unit characters of Mendelian inheritance. In the latter case we are professedly speaking of structure, while in the former we commonly have in mind the activities which arise as a result of the structural inheritance, neural or non-neural. Thus we speak of the inheritance of the swallowing instinct or of the instincts of crawling and walking.

Here we are referring to an activity. Clearly enough, however, there can be no such thing as the inheritance of an activity as a Mendelian or unit character, for an activity is an abstraction, that is, an abstract synthesis of concrete movements, when viewed from the structural side. The term inheritance or instinct used in this way is really a misnomer. What we actually mean to indicate is that we inherit a structure or an organization or a chain of simple structures which enables us to act in a characteristic way with a minimum of trial and error. The instinctive structure should go into action without calling forth a consciousness of effort and without involving a learned readjustment to the stimulus which sets off the characteristic action. This point is well illustrated by the following passage, referred to in an earlier chapter, describing the working of the flying instinct in the fly: "The nervous mechanism is perfected, and when hatched and dry the fly makes its first circuit as accurately as if it had practiced the movement for days." [1] This initial perfection of the instinct is denied, as was brought out in the discussion in a previous chapter. But, as was there indicated, the denial is justified only when the instinct itself is incompletely organized, as is so frequently the case in the higher or habit-forming animals. In the lower forms of animal life the initial accuracy of the instinct is much as Gamble has here described it. But in the higher forms the instinct becomes distorted, either through being bred out by the substitution of environmental controls for internal organization and control, or because of the lengthening of the period of infancy, which displaces the instinct organization and prevents it from functioning in unmodified form. That is, habits are already formed before the instinct gets into operation. In the former case, we have vestigial instincts; in the latter, we have delayed instincts. In the one case the disrupted or atrophied instincts may be

[1] F. W. Gamble, *The Animal World*, 225.

reconstructed as habits by organization and training; in the other the instincts are likely to be repressed or considerably modified by the habits which are formed before the instincts have a chance to come to maturity.[1]

It is only through conceiving of instincts in terms of definite structures that we can reach a definition or description of them which is more than merely a logical arrangement of word symbols which may or may not have any accurate relation to structural facts. The futility of speaking of activities or attitudes as instincts, when these activities and attitudes cannot be reduced to unit structural organizations capable of transmission by means of biological heredity, at once becomes apparent. It is not enough, however, that we find the gross physical structure or the inner neural correlate of an activity or attitude in order to establish the fact that it is an instinct. Such a structural organization may be an acquired habit, for habits must have their physical and neural organization bases quite as well as instincts. It is true, nevertheless, that there is no instinct where this unity of structure does not exist. We must learn to distinguish between the inherited and the acquired nature of such underlying physical organizations. The final criterion here is one of fact. That is to say, was this organization determined in the chromosome structure of the reproductive cells of the parents of the individual, and did the individuals themselves, as a matter of fact, develop this organization without making a trial and error adjustment and without environmental determination exercising a predominating influence? Or, did the activity in reality come from a modification of structure environmentally induced, either consciously or unconsciously; postnatally, prenatally, or preconceptually? [2]

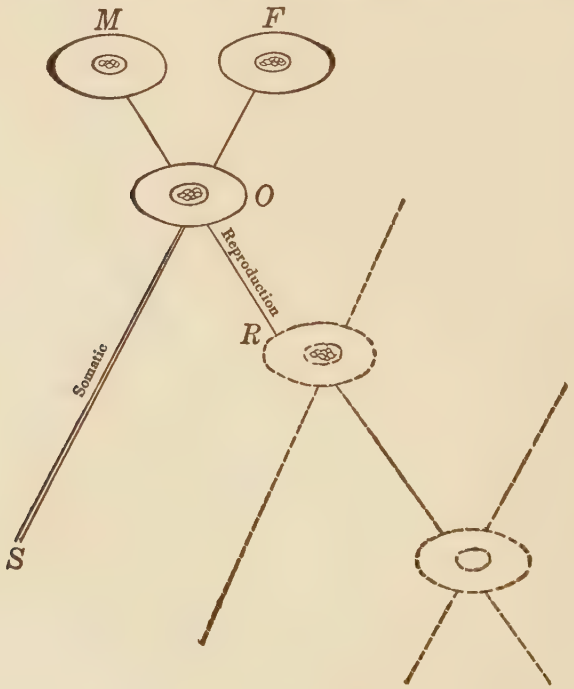
[1] These points are discussed more fully in other chapters.

[2] See "The Significance of Environment as a Social Factor," *Publications of the American Sociological Society*, XVI, 84–112, for a discussion of methods of operation of environmental factors.

These questions can be answered finally only through the aid of a mass of detailed investigation which now has only been begun. They certainly cannot be settled on the mere basis of opinion or through speculative or a priori reasoning. We can, however, aid in clearing away some of the obstructing debris of prejudice, dogmatism and opinion in regard to these matters by invoking a definite statement of the facts of heredity as they bear upon the disputed question of the relation of instinctive to acquired activity. If we can show the biological limits and possibilities of inheritance, on the one hand, and if we can make clear the conditions under which characteristics can be acquired and what types of characters may be acquired under these conditions, on the other hand, we shall then and only then be in a position to begin the process of gradual accumulation of facts. Only through working out such a method of approach shall we be able to see clearly where our facts lie and to define and classify them when we find them. In the present and subsequent chapters such a delimitation of the field of heredity will be attempted.

The new individual arises from the union of the parental reproductive cells. This fact may be diagramed symbolically as follows, it being kept in mind that the diagram is only a symbolic, not a photographic, representation. M and F symbolize the male and female reproductive cells respectively; O the offspring cell resulting from fertilization; and the lines OS and OR symbolize the development, through division, of the somatic and reproductive cell aggregations respectively. Detailed descriptions of the mechanics of fertilization and heredity and of the growth of the organism may be found in the standard works on these subjects. The offspring begins its existence as a single cell resulting from the union of the matured parental cells, including cytoplasm as well as chromosome content. The future development of the new individual comes through a process of cell division. This cell division

in the somatic tissues of human beings proceeds to a remarkable extent, the multiplication of body cells aggregating something like 26,500,000,000,000.[1] The number of reproductive cells differs for the male and female. Lode calculated that



approximately 340,000,000,000 spermatozoa are developed in the male between the ages of twenty-five and fifty-five.[2] But the new born female contains only 36,000 to 200,000 ova, "of which no more than about 30,000 remain at puberty, the others having undergone atrophy and having served as food material for the more vigorous ova. Of these 30,000, no more than about 400 become mature, one at each menstrual period between the ages of about fifteen to forty-five." [3]

[1] Authority cited in W. M. Feldman, *The Principles of Ante-Natal and Post-Natal Child Physiology*, 5. [2] *Ibid.*, 18. [3] *Ibid.*, 20.

Although the new organism begins its separate or individual existence as a single cell, this initial cell divides into two general types of cells, the somatic and the reproductive, as was implied above. The reproductive cells are highly specialized and do not perform any adjustment function with regard to the individual's environment. The reproductive cells are split off from the somatic cells in the first few hours of the existence of the new organism, the separation occurring among the first cells which result from the division and multiplication of the new individual cell organism. The result is that the reproductive cells are very early removed from the possibility of being easily contaminated by the environmental accidents of the somatic cells, since they are split off before the somatic organization has had much opportunity to be influenced by environment. Ever after this initial separation the reproductive cells maintain their separate existence and reproduce themselves by fission, just as do the somatic cells. They are segregated and stored in an inner portion of the body where they will be as free from external influence and harm as possible. They are normally discharged for reproductive purposes, though the discharge mechanism is not so definitely and instinctively adjusted to stimuli connected only with reproduction that the cells are discharged either in the most economical or effective manner or even solely for reproductive ends. Nature being blind, as the old aphorism has it, is prodigal here as elsewhere in order to make sure of some, though possibly not the best, results. This fact is abundantly testified to by the vast excess of spermatozoa over ova. The hereditary determiners are organized in the chromosome content of the nuclei of these reproductive cells. The nucleus or inner portion of the cell is separated from the external portion of the cell or cytoplasm by means of a surrounding sac or tissue. Although there is interchange

between the two parts of the cell, the inner portion is more protected from outside influences and leads a more isolated existence. It carries the chromosome content which determines the inherited traits of the offspring. The function of the reproductive cells, apparently, is to carry these hereditary determiners of the chromosomes as safely as possible and as completely unmodified by the somatoplasm and external environment as possible and to aid in their deposit under such conditions as will secure fertilization and initial growth. An elaborate bodily structure makes possible this process.

As stated above, this inheritance is apparently determined through the chromosome content organized within the nuclei of the reproductive cells. Some writers on biological subjects speak of the possibility of cytoplasmic inheritance,[1] but the prevailing opinion appears to be to the contrary. The current conception of heredity is that it is a matter of chromosome determination, while influences from cytoplasm are perhaps more properly classified under environmental factors. Julian S. Huxley is of the opinion that the majority, possibly all, characters are due to the Mendelian genes and finds no evidence to the contrary.[2] He cites approvingly Morgan's view [3] that each chromosome represents a linkage group of characters and that the intensity of the linkage varies inversely with the linear distance of the genes along the chromosomal frame-work. The theory is that the chromosomes which determine the heredity do not act as individual units in this determination, but that parts of the chromosomes operate as individual factors.[4]

[1] See, for example, E. G. Conklin, *Heredity and Environment*, 175–177.

[2] "Some Implications of the Chromosome Theory of Heredity," *Science Progress*, XVI, 236.

[3] E. L. Morgan, *The Physical Basis of Heredity*.

[4] D. Ward Cutler, "The Cytological Problems Arising from the Study of Artificial Parthenogenesis," *Science Progress*, XV, 437.

Huxley adds, "The chromosomes and their contained genes may be looked upon as the regulating mechanism which makes heredity, and indeed any real organic constancy from generation to generation, possible at all—the regulating mechanism of the species. . . . The gene-constitution of the organism is a mechanism for preserving the character, number, proportions, and locations of a great number of unit factors; and it accomplishes this by being itself a unit of a higher order, whose parts are linked together in a definite and specific way, each of the parts, and therefore the unit-complex as a whole, being self-perpetuating." [1]

This mechanism for controlling the heredity or making for the continuity of the type is chemical in character. It also resists modification from the external environment, although it is sufficiently susceptible in the long run to the influence of some external agency that the character of the heredity or of the inherited organization may be modified.[2] Some think that we may even learn in the course of time to alter the genes at will and thus direct the heredity in the channels which we desire, but there certainly is no immediate prospect of this.[3] Huxley thinks that the only possibilities of such direct modification are, (1) that some side-chain of a gene may be so altered that the details of its working will be changed while the main essentials remain the same, and (2) that by stimulating the gene to overproduction the structure or content of the inheritance determiners may undergo change.[4] R. S. Lillie is of the opinion that possibly "the appearance of a sudden variation or mutation in an organism is the result of a chemical change," such as the substitution of one chemical for another in the organism on the analogy of substituting cadmium for

[1] *Op. cit.*, 241–3.

[2] Tower's experiments with Colorado potato beetles afford an example in point.

[3] J. S. Huxley, *op. cit.*, 243.

[4] *Ibid.*, 244.

zinc in the growth of physical objects, by which changes of form and structure are induced.[1] He continues, "The formation of a new compound in formative metabolism may thus mean the appearance of a new structural and physiological character." [2]

Environmental factors operate primarily in modifying or conditioning the growth of the organism, rather than in directly determining its heredity. Especially, acquired characters are not transmitted by inheritance, except possibly in relatively rare and poorly understood instances, such as in that of the much discussed case of Guyer and Smith's experiments on rabbits.[3] While the influence of the environment in a non-inheritance manner is shown where outside factors produce artificial fertilization of the eggs,[4] growth in the organism apparently is produced by the genes themselves. Some factor leads to the production of certain specific ferments, and different multiple allelomorphs of a single factor may represent different degrees of oxidation, while other factors may lead to the production of substances which inhibit

[1] "Growth in Living and Non-Living Systems," *Scientific Monthly*, 14:125.

[2] *Ibid.*, 125–6.

[3] In these experiments a serum of pulped rabbit lenses was injected in the mother with the result that she produced lenseless offspring, the effect being cumulative, without further injections. Of course all possibilities of prenatal environmental determination were not completely done away with here. If, however, we accept as true the inheritance of this trait, we may properly raise the question as to whether these modified inherited characters were acquired through the somaplasm indirectly; or whether they were produced through environmental pressures brought to bear on the chromatin directly, without first transforming the somatic structures. That is, did the chromatin respond to the environmental stimuli directly; or—a third hypothesis—did the conditions of development in the environment (see article by Huxley, *loc. cit.*) change the equilibrium and select the dominance of different determiners and developments, without either of the first two processes taking place? For favorable discussions of the inheritance of acquired characters, see E. W. McBride, "The Inheritance of Acquired Characters," *Science Progress*, XV, 392–405; Guyer and Smith, *Journal Experimental Zoölogy*, 31; 171 ff.

[4] Cutler, *op. cit.*, 436.

the action of these ferments, and growth is controlled accordingly.[1] "Whether these ferments are produced directly by the individual gene, or as the end-result of a long series of reactions in the cell, we have as yet no means of telling." [2] Thus, the differentiations of the developing fertilized egg take place as the result of the reaction of the genes with the environment. The cytoplasm influences development, not in determining the character of the differentiation, but as a basic material necessary to the life and the complete development of the cell. The organ-forming stuffs in the cytoplasm of the egg aid in the early development of the organism.[3] The differential development of the organism, in early stages, and otherwise, is determined largely by the organization of the environment in the large, which selects the gene-produced structures and organizations which are fitted. Some cells are immune to certain types of environmental selection and others are susceptible. Also, environmental control mechanisms, such as endocrine secretions, play a large part in selecting the direction of the growth of the organism.[4] The material of the gene probably in some cases actually corresponds with the material of the adult organ which it helps to determine.[5]

The somatic cells multiply through division into aggregations which are of four general hereditary types. The total conformation and organization of these somatic cells develop according to general organic type. The somatic cells splitting off from the initial offspring cell, resulting from the union and fertilization of two reproductive cells, from dogs, for example, always aggregate in the form and structure and chemical composition and organization of dogs and not of other animals. The same is true for all other animals and for plants. In like

[1] Huxley, *op. cit.*, 249. See also Feldman, *op. cit.*, 255 ff.
[2] Huxley, *ibid.*
[3] *Ibid.*, 238–9.
[4] *Ibid.*, 246–8.
[5] *Ibid.*, 249.

manner, these differentiated somatic cells aggregate into the form of those organs or unit aggregations of cell structure within the total structure or organism which normally characterize the type. Each animal has a head and a head of a certain type according to that variety, species, genus, etc., to which it belongs. These two types of hereditary aggregations of somatic cells are closely correlated in their development. A third type of aggregation of somatic cells is also noticeable: the development of differential traits, such as eye, hair, and skin color, head-shape, nasal and facial indices, and the like. These are the traits to which we commonly apply the Mendelian principles of inheritance.

A still more specific and detailed structural inheritance is to be found in the nervous system. Just as the general and specific physiological and anatomical organization of the organism is inherited through the chromosomes, so various elements of neural structure or organization, which serve the organism in making rapid and accurate adjustments to its environment,[1] are inherited. These are the reflexes and the instincts. They have come into the inheritance process by natural selection in the service of survival, or otherwise, in the same general way in which the other factors of inheritance arose. It is reasonable to suppose that they are subject to the same laws of origin and transmission. They differ merely in being primarily facts of neural organization, with their end organs and muscular and glandular response connections, rather than of muscular and other largely external and gross tissue organization and chemical content and distribution. They may also differ in complexity. But they, equally with the others, belong in the category of inheritance and are subject equally to the laws of unit characters. All of these traits are inherited, that is, they come down through the

[1] See Chapters V and VI for a discussion of the economy of the nervous organization.

structures and the chromosome determiners of the reproductive cells and are not acquired from the environment. The chromosome filaments of the two parent cells uniting in the new derivative cell apparently control the organization and distribution of the somatic cells, which arise through division, and group them according to type.

Four facts having definite bearing on the hereditary and unitary nature of the instincts should be noted in connection with the fertilization process and the development of the somatic cells. First, the hereditary equipment of the new-formed individual is completed at the point of fertilization. Any characteristic received after the process of fertilization has taken place, that is, not contained in the chromosomes of the uniting parent cells, is not inherited. It is acquired. Likewise, any predisposing influence which affects the outer portions of the parental reproductive cells before fertilization, but which does not modify the determiners or chromosome content, cannot be classified as an inheritance or instinctive influence or factor. It belongs to a category which we may, for want of a better term, denominate pre-conceptual environment. The nature of the new individual, so far as his inheritance is concerned, is formed once for all at the point of fertilization, where the chromosomes unite and determine their control over the newly forming somatic organization. "The impregnated egg cell in the process of its first division into two new cells typifies the entire development of the completed human being. There within that minute compass lie the materials which predetermine with fatal exactitude the future of the adult form, its sex, its type of stature, the blending of the traits which it owes to its parents and their parents." [1] Many more characteristics will be acquired by the

[1] C. A. Herter, *Biological Aspects of Human Problems*, 42–43; see also p. 121, and W. Bateson, "Heredity," *Smithsonian Institution Report*, 1915, 377.

somatic constitution from the various environmental pressures, and, with regard to some types of organization, the individual may even be primarily made over as contrasted with the line of development indicated in his inheritance determiners or chromosome content. But this acquisition of a made-over content is not brought about through inheritance. It comes from the environmental factors working upon the inherited equipment and modifying it. Of course there are very obvious and definite limits within which the hereditary equipment can be modified. One cannot transform by any sort of environmental pressure one type of animal into another or one organ into another organ or, possibly, black hair into red hair. It is possible, however, to train one animal or one organ to perform in large measure the functions of another, or artificially to color hair. Also various types of intelligences or mental coördinations can be built up on the basis of inherited neural organizations or dispositions. In the matter of moral and social attitudes the individual can be almost completely transformed through environmental pressures, because such characters are not in the first instance inherited, or at least the inherited basis is not usually rigidly determinative of the moral and social traits which are later acquired.

(2) Only the structural organization of the somatic cell aggregations is determined by the hereditary determiners in the new cells through the fertilization process. Somatic structures of the sort described above are inherited directly (unless acquired from environmental pressures or conditions). Mental, moral and social traits are not thus predetermined in the chromosome organization in the same manner as the simple somatic traits or organic structures are; for the former, owing to their abstract quality, do not represent any fixed relation to physical structure at all. Therefore, they are not inherited. There is no way in which these highly variant and variable traits could be directly determined by the chromosome con-

tent, for the process of inheritance determination is biological, while the determination of these traits is at least partly social. It is true, however, that the somatic structures, including the gross organic structures and any preformed neural dispositions upon which the mental, moral and social characteristics rest, are thus determined in the chromosomes. In turn they largely determine, indirectly, by means of their functioning, the non-physical abstract or ideational characteristics. Thus one might be inclined to speak of an indirect determination or inheritance of mental, moral and social characteristics. Such, however, would be incorrect; for the determination of these abstract traits from the standpoint of heredity is only partial and often minor. Subsequent chapters will undertake, in some slight degree at least, to indicate the extent to which environing factors determine these non-physical traits. It is because of this necessary distinction between inheritance and environmental factors in the determination of these mental, moral and social traits that we find it inaccurate to speak of them as instincts in the same sense that we speak of the activities based wholly on inherited somatic structures as instinctive.

(3) It should also be further emphasized that the somatic structures do not influence the inheritance determiners of the reproductive cells in any specific way. This is a fact which is generally accepted. The reproductive cells are completely surrounded by the somatic cells and draw their sustenance from them and are therefore subject to general influences of various sorts from them. But these influences are external rather than in the nature of specific modifications of the chromosome contents. Various toxic conditions in the somatic organization may be carried over into the reproductive cells and produce changes there, such as disintegration, abnormally stimulated development, sterility (because of injury to the cell content), or even destruction. But no machinery

is known by means of which a specific character of the somatic organization, inherited or acquired, could conceivably impress itself upon the inheritance determiners, "photographically" or "telegraphically" as it were, in such a way as to cause the inheritance of that same trait in the offspring. Because of the improbability or even impossibility of such direct internal modification of the inheritance determiners we are accustomed to say that acquired characters are not inherited. It can readily be seen from the preceding discussions that the transmission by inheritance of the moral and social complex mental traits acquired by the parents would be even less conceivable or probable than that of the more concrete acquired physical structures and habits.[1]

But if the inheritance of acquired traits—particularly of the mental, moral and social sorts—should, by some unexpected turn in the evidence and experience, be demonstrated, the claims of the environmental interpretation would be strengthened thereby. This fact would establish the direct determination of the instincts by environment, the character

[1] There is no intention of denying dogmatically the possibility of some form or degree of the inheritance of acquired characters, conceivably by means of the engrams of Semon as set forth in his mnemic theory, or otherwise. However, the concrete evidence of such a type of inheritance is as yet so slight that the general statement made above must stand for the present. If the mnemic or any other hypothesis of the inheritance of acquired characters should prove to be justified in some form or degree this fact would not essentially affect the conclusions set forth in this book, for it is not conceivable that complex and abstract mental, moral and social characteristics would be as easily "photographed" or "telegraphed" into the protoplasm of the germ cells as would the very concrete habits and structural traits. Although such transmission of concrete traits could be easily observed, if it occurred, it is not sufficiently well established to justify the application by analogy of the theory to the abstract traits. For a statement of the mnemic hypothesis see Richard Semon, *The Mneme*. For discussion of other theories of inheritance of acquired characters see note to discussion in an earlier part of this chapter. The supposed instances of the inheritance of acquired characters recently described by Guyer and others are probably examples of environmental (non-Mendelian) transmission, taking place through the medium of the blood or other tissues rather than through the chromosomes.

of the environmental pressures impressing itself more directly upon the resulting heredity. According to the currently accepted theories of heredity and environment, the determination of the instincts and other forms of inheritance is indirect rather than direct. Furthermore, there is no copying of the form or type of the environmental pressure into the inheritance mechanism and the resulting hereditary traits, as there might be if the latter were directly determined by the environment. By means of the indirect method of determination the inheritable traits which appear in the organism through the processes of variation or mutation are selected out of the heredity and lost, or selected in and perpetuated, as a phase of the racial adjustment of the type, to which the individual organism belongs, to the demands of its environment. Nothing can survive in the type which is markedly harmful to the individual, because of the advantage in the competitive struggle to exist and reproduce which those individuals not adversely incumbered have over those who are thus handicapped by unfavorable traits. Thus, in any case, it is environment which in the long run determines the inheritance, whether it produces the variations and mutations—the traits—by direct action or merely by indirect or selective pressures. The weight of evidence, however, is to the effect that this environmental determination is indirect and selective rather than direct and formative. It is on the basis of this evidence and assumption that the arguments in this chapter are set forth.

(4) This argument for the non-inheritance of acquired somatic traits is further re-enforced by the fact that reproductive cells do not transmit the same traits as those contained in the aggregate somatic structure. This is equivalent to saying that the hereditary determination in the reproductive cells of an organism is not the same as the visible characters produced through the hereditary aggregation of

the somatic cells of that organism. According to the Mendelian ratios the two series of traits may be represented by the following equations. The results of the original experiment of Mendel are here presented. The letters T and D represent respectively the tall and dwarf strains of peas which

$$(1)\ \mathrm{TT} \times \mathrm{DD} = \frac{\mathrm{TD\ TD\ TD\ TD\ (Inheritance\ traits)}}{\mathrm{TT\ TT\ TT\ TT\ (Somatic\ traits)}}$$

$$(2)\ \mathrm{TT} \times \mathrm{TD} = \frac{\mathrm{TT\ TT\ TD\ TD\ (Inheritance\ traits)}}{\mathrm{TT\ TT\ TT\ TT\ (Somatic\ traits)}}$$

$$(3)\ \mathrm{TD} \times \mathrm{DD} = \frac{\mathrm{TD\ TD\ DD\ DD\ (Inheritance\ traits)}}{\mathrm{TT\ TT\ DD\ DD\ (Somatic\ traits)}}$$

$$(4)\ \mathrm{TD} \times \mathrm{TD} = \frac{\mathrm{TT\ TD\ TD\ DD\ (Inheritance\ traits)}}{\mathrm{TT\ TT\ TT\ DD\ (Somatic\ traits)}}$$

he bred to each other. In the above equations T is dominant over D. In the terms to the right of the equations the symbols above the line represent the distribution of hereditary traits in the unmatured reproductive cells of the four hypothetical individuals proceeding from the union indicated to the left, while the symbols below the division lines represent the traits as they appear in the aggregated somatic structures of each of the four individuals, that is, as they look to the eye. It is interesting to note, in this connection, that social traits are somatic.

The bearing of this fact of the non-inheritance of gross or aggregated somatic characters upon the problem of instinct is that it removes the only substitute possibility of the inheritance of complex mental and moral and social characteristics. If it be proven that these general non-physical traits are not determined in the regular inheritance process, it might still be claimed by those who hold to the doctrine of the inheritance of acquired characteristics, as indeed it has often been maintained in the past, that these traits once

acquired may be transmitted biologically. This residual explanation, however, becomes untenable, once it is shown that the gross or visible somatic characters, resulting from external aggregation, are not necessarily the same as those carried in the determiners of the chromosomes. Unless acquired somatic characters can impress themselves directly upon the chromosome content and thus become determinative in the reproductive cells—which, as pointed out under (3) above, is shown by experience not to be the case—they cannot therefore enter into the heredity. It was once supposed that, externally considered, like produces like, that is, that an external characteristic, such as color or stature, in some mysterious way necessarily reappears in the offspring. The distinction illustrated by the above diagrams between the somatic or external traits (those below the dividing line) and the traits implicit in the chromosomes of the cells (those above the dividing line) was not then realized. But there is now abundant evidence to show that inheritance is only through the determiners of the reproductive cells (the traits above the line). Many, including some of those who understand the Mendelian theory as well as those who do not, still fall into the error of speaking of inheritance as if such a reproduction of external traits occurs. Such not being the case, there is at least no more reason for supposing that an acquired somatic trait will reproduce itself through inheritance in the offspring than that an inherited somatic trait will necessarily so reproduce itself.[1] The inherited somatic trait is itself determined by the contents of the cell. That is, it is the end of the inheritance process, and not a link in that process having power to determine links further on. Much less, then, should we suppose that the acquired somatic trait,

[1] For other reasons pointing to this same conclusion that somatic traits could not photograph themselves on or reproduce themselves in the inheritance determiners see the discussion, "The Significance of Environment as a Social Factor," *Publications of the American Sociological Society*, XVI, 84–112.

which is not even an end link in the hereditary chain, should have the power of influencing the chain of heredity.

In an earlier part of the present chapter, in discussing the criterion for distinguishing between inherited and acquired traits, it was stated that the test resides in a factual determination of whether the activity or attitude sprang up spontaneously and as a result of the natural growth processes, without marked trial and error adjustments, or whether it obviously had to be learned. It is now desirable to state this distinction more specifically and completely. Some activity and attitudinal traits may appear seemingly spontaneously, without obvious learning, and yet they may not be determined in the inheritance process. We may outline the sources of activity as follows:

I. Structure and organization inherited (fixed by the inheritance determiners).

II. Structure and organization not inherited.

1. Determined by purely organic conditions of development.
   a. Where a developing organ or organization, itself, possibly, but not necessarily, determined by heredity, in turn determines the direction or degree of development of a structure or organ not itself determined in its final form by heredity.
   b. Where a structure, whether inherited or acquired, is modified and in some degree determined by mechanical and externally arising environmental conditions.
2. Determined by a more or less consciously and visibly controlled adaptation process.

It is quite clear from the above analysis that all activities arising from adjustment structures and circumstances under

II, 1, a, would appear to superficial observation as inherited. Likewise those activities arising from II, 1, b, where the "accident" occurred before birth, and frequently even after birth, if the connection between the resulting structure and activity had been overlooked, would give the same impression. Such activities, especially those of the former class, would arise automatically with little or no trial and error adjustment. Therefore they could not be distinguished by uncritical observation from inherited acts and attitudes. Consequently we see again illustrated the necessity for a critical analysis, going beneath the surface aspects of phenomena, in order that we may make a dependable classification of instinctive and non-instinctive activities. Unfortunately the experimental biologists are not yet able to give us extensive or completely satisfactory data as to what structures are the result of direct hereditary determination and what ones proceed secondarily from the conditioning pressures of the development of other structures and those arising from external preconceptual and prenatal conditions. However, this limitation to our knowledge does not rear an insuperable barrier to drawing significant conclusions with regard to the respective fields of instinct and acquired habit.

CHAPTER XII

CONDITIONAL DEVELOPMENT AND DELAYED INSTINCTS

The old uncritical opinion that our biological inheritance consists of whatever traits we possess at birth is too narrow, from the standpoint both of what we do and of what we do not inherit. The fact of birth is, to the person who knows nothing of embryology and but little of individual development in general, such an impressive fact that it completely overshadows other equally or more important events in the early life of the child, considered from the standpoint of heredity. Before this event the life of the child is for perhaps most minds shrouded in mystery. To the ordinary imagination the existence of the child before birth is very hazy, or it is pictured as occurring in some poetic realm which is connected in religious dreaming with the transmigration of souls or with a life of bliss, children being angels or flowers or other beings before birth, according to the various types of poetic beliefs. All this of course has no relation to what actually occurs in the months before birth. Before the science of embryology developed nothing scientific was known about prenatal life, except a few vague impressions which arose from the disemboweling of pregnant women, Cæsarean operations, premature births (which were not at first recognized as such) and the like. Our present knowledge, however, is much more accurate and detailed. Feldman says that the child has already undergone by far the greater part of its development before its birth, "For whilst from the moment of birth till adult age the child increases only twenty-fold in weight and

about three and a half times in length, the increment in weight from impregnation to birth is no less than 906 million-fold, and its increase in length is 2,500-fold." [1] After the birth of the child all obvious changes are easily observed and a fairly dependable general account of this period of development grows up in the minds of observers.

A closer observation of environmental factors and of the methods by which they operate and also a critical analysis of the methods of heredity, such as has been undertaken by Mendel and Weismann and their successors, have taught us that the life history of human traits is much more complex than men had formerly been accustomed to regard it, or than many biologists apparently still consider it. It is, therefore, obvious that we cannot now hold to the old dictum that all traits appearing at birth are inherited. Both prenatal and preconceptual environmental influences have had their share in producing the character of the child up to this point.

Equally true is it that not all of the inheritance of the child appears at the time of the birth of the child, at least not all such traits appear on the surface at that time. All his hereditary traits have been fixed by that time; in fact they were fixed at the time of fertilization. The popular mind, which did not think in terms of Mendelism, was until very recently prone to regard the accumulation of inherited traits as going on throughout the prenatal period. The process of receiving inherited traits was looked upon as some vague method of absorbing from the mother (and father) the parental traits. Darwin somewhat systematized this theory of absorption of traits in his theory of pangenesis. The first great and decisive blow to the absorption theory came when Weismann put forward his hypothesis of the uncontaminated germ

[1] W. M. Feldman, *The Principles of Ante-Natal and Post-Natal Child Physiology, Pure and Applied*, 4. See also pp. 122, 252–5.

plasm as the source of inherited characteristics. The death blow was finally dealt to it when the theory of the transmission of inheritance by unit characters through the chromosomes was advanced by Mendel and confirmed by other investigators. But the theory of Mendel has been in the current of biological literature only since about 1900, and while all the recent books on heredity and eugenics give an explanation of it, in some part of the work at least, by no means all of those writers employing biological data have yet applied its principles to the reconstruction of their own theories. The result is that there is often a radical contradiction between different parts of their work,[1] as well as between their accepted theory of method and their practice of methods.

While no hereditary traits are received after the point of fertilization not all inherited traits become manifest externally by the time of birth or even for some years afterwards. This fact of the delayed development of inherited or instinctive traits is sometimes mistakenly spoken of as "delayed inheritance," though our previous analysis has shown that such delay in inheritance is not possible. While the causes of such delayed appearance of instinctive traits are frequently obscured, the fact itself is entirely conceivable and demonstrable.[2] The development of animal tissues and organs seems to be more or less conditional. One phase of growth appears only when some other precondition of growth has been con-

[1] Such a contradiction has previously been shown in the works of Gamble and Feldman and other writers.

[2] It is possible to hold that traits are not determined in the inheritance at the point of fertilization, but that all future development is the result of environmental conditioning and thus that our traits are mainly or wholly of direct environmental origin. The investigations of the chromosome mechanisms lead contemporary biologists to hold to the contrary view. But if this theory should prove to be correct it would only strengthen the argument of this book. In presenting the criticism of the theory of instinct found in these pages it has been the intention of the author to base his biological arguments on the currently accepted and best attested theories in the science of biology, since this has seemed to be the only sound procedure to follow.

summated. This is true not only of traits or characteristics which are of hereditary origin but also of those which are the result of environmental pressures. In connection with environmentally induced characteristics, the individual does not write books before he has learned the use of language, nor can he engage in sports before he has developed coördination of simple movements of his extremities through the elementary processes of sensory-motor localization. In a much more specific and definite way is the appearance of the inherited structures conditioned upon the previous appearance of other inherited structures which develop earlier in the series. Thus the eyes do not appear in the embryo until certain nervous structures have reached a particular point of development and the initiai coat of hair, the lanugo, comes and goes as the result of certain internal changes characteristic of the embryo. The thymus gland appears before birth and is absorbed in infancy or childhood, having performed the functions for which its secretions are necessary in the developmental process. If it appears or persists at a later stage in the developmental process it is likely to prove troublesome because of the disarrangement of vital functioning and development which it causes.

Apparently much or most of this conditional development or completion of inherited traits in the structure of the organism is governed by the internal secretions, especially those of the thymus, thyroid, pituitary, adrenal, as well as those of other, and minor, glands.[1] The phenomena of giantism

[1] See, for example, H. W. Cushing, *The Pituitary Body and Its Disorders;* S. W. Bandler, *The Endocrines;* L. Berman, *The Glands Regulating Personality;* W. B. Cannon, *Bodily Changes in Pain, Hunger, Fear and Rage.* These works are not considered to be of equal value, but they are suggestive of a line of investigation which will be pursued more fully and accurately in the future. Even the conventional physiologists and neurologists are taking cognizance of the influence of the ductless glands upon the growth of the organism and its personality, as is shown in passages in Feldman, *op. cit.*, C. J. Herrick, *Introduction to Neurology;* S. Paton, *Human Behavior,* etc.

and dwarfism and of disturbed nervous conditions may be cited as examples in this connection.

Furthermore, it should be noted that the child at the time of birth differs very greatly from his appearance at twenty or twenty-five years of age. The most marked difference perhaps is in stature, for at the former period he is on the average only two-sevenths as tall as he is at the latter date. Also in the matter of proportion of parts of the body to height he differs greatly between those two age periods.[1] These differences in proportion are apparently largely matters of heredity, though not entirely so, because nurture conditions such matters to no inconsiderable extent. The voice also differs radically between the time of birth and maturity and not merely because of use. General organic appearance and functioning likewise show marked changes. For example, the digestive organs are adapted to different types of food at the different developmental periods. The surface structures of the body expand and harden, the face for example growing broader and more definitely marked, the nose especially becoming more prominent. Hair begins to grow on the face of the male of certain races and on other parts of the body of both sexes at about the time of reaching sexual maturity. These and many other physical changes take place apparently in large degree on the basis of inherited traits which are disclosed or brought visibly into the structure under the influence of secretions or other stimuli which appear to function at well-defined stages of development. That the matter of external environmental pressures has much to do with bringing out some of these traits at certain times cannot be doubted, and it is difficult to distinguish definitely between those structures which are due to heredity and to environment. It is not certain to what extent the deeper pigmentation of

[1] Feldman, *op. cit.*, 120, 146, 148, 157, 169, 178, 180–6, 200 ff., 216–18, 228–9, 250–5, 557–8, 569, 646, etc.

the hair which comes with approach toward maturity is due to conditional development of inherited traits and to the indirect influence of light or to the increased activity of some internal secretion stimulated by environmental factors. In certain races the hair is very dark from the time of birth, though there is some darkening of pigmentation with increasing maturity in all races. Likewise it cannot be said definitely to what extent the change of the soft baby face into the hard well-marked and emphasized features of the adult is due to the strain of the environment working directly and indirectly upon the maturing individual and to what extent to inheritance. It is certain, however, that facial expression is not to be accounted for exclusively on the basis of either heredity or environment.

Generally speaking, then, we may say, that at least four general types of organic conditions, with an almost infinite number of special details, affect the development of the organism. First, in the reproductive cells and the cells resulting from the fertilization of the ovum by the male reproductive cell, injuries [1] to the egg, the position of the cell [2] and the surface tension,[3] all condition development. Second, the presence of infections, toxins, chemical reagents, temperature and nutritional conditions in the preconceptual and prenatal environments of the embryo or fœtus, as well as in the postnatal stage of development, produces marked effects upon the developmental process.[4] Third, the internal secretions of the ductless glands, which are already well developed and able to perform their functions in the fœtal stage,[5] have very decided results upon the growth process, as well as upon the general functions and functioning of the organs and vital organization, including the nervous system.[6] Finally, in

[1] *Ibid.*, 85.
[2] *Ibid.*, 92, 111.
[3] *Ibid.*, 97–8.
[4] *Ibid.*, 111–113.
[5] *Ibid.*, 186–90.
[6] *Ibid.*, 186–90.

certain cases at least, organic structure does not fully develop until nervous connections are made, while in other cases the use of an organ seems to induce the development of neural connections.[1]

Much of this conditioning of development is predetermined in the hereditary organization itself. That is, the development of one organic trait or organ or tissue organization or content, appearing as the result of the inheritance determined in the chromosomes, makes necessary or practically inevitable the development of some other tissue, organ or organization. A number of questions of interpretation arise in this connection. Is it proper to speak of hereditary determination when development is conditioned by an inherited structure, or organ, or by a structure or organ which was itself immediately or remotely determined by a tissue or organ or organization which was hereditarily determined? How can we tell, in the present state of our knowledge, when a particular growth or organization is determined by the genes in the nucleus or merely by antecedent conditions? Is heredity itself anything more than growth and organization determined by these antecedent conditions of growth and organization, even in the reproductive cell and its fertilized product? If this last proposition should prove correct, does the whole process of inheritance finally reduce itself to a more complicated problem of environmental organization? As yet, as important as they are, these questions cannot be answered with full satisfaction. In some of the cases cited above quite clearly the conditioning influence is an extraneous environmental factor. Especially is this likely to be the case under type (2) above, but it may be true in any one of the four types of conditional development mentioned. In other cases the conditioning factor is a by-product, rather than an integral part of the developmental process. In either case it is clear that environ-

[1] *Ibid.*, 591.

ment, as well as inheritance, conditions the development of the organism.

Feldman classified the developmental stimuli effective in this developmental process under two general headings, as follows:

1. Physical
   a. Mechanical
   b. Thermal
   c. Electrical
   d. Radiant
   e. Light
   f. Density of medium
   g. Gravity and centrifugal force, etc.
2. Chemical
   a. Substances found in normal development, *e. g.*, oxygen, CO_2, water, food, internal secretions, etc.
   b. Substances not found in normal development, *e. g.*, salts, acids, alkalis, alcohol, tobacco, toxins, etc.[1]

He continues, "We have seen that, by the elimination of certain of those stimuli which are normally present, animals have been formed in which certain organs or parts of the body are lacking, or are found in abnormal positions. In this way dwarfs, giants, one-eyed monsters, anencephalic or acephalic fœtuses, as well as all sorts of double and partial fœtuses, have been produced. Indeed, one may make the general statement that all defective or monstrous forms of development are, as a rule, due to alterations of the normal stimuli rather than to defective hereditary factors." [2] This is certainly leaning far toward the environmental interpretation of the growth process, at least in its abnormal aspects. In answer to the question, "What influence has environment upon development?" he says, "It is clear that heredity and environment must be considered as complementary factors in

[1] *Op. cit.*, 110.

[2] *Ibid.*, 110–111. See also p. 7.

the question of development, since, in the absence of environmental stimuli, not only would the germ cells never be made to fuse, but would fail to develop after fusion had taken place." [1]

If we turn to lower forms of animal life we observe much more striking transformations in structure, adaptation and functioning in the developmental process. For instance, let us quote the following passages from Gamble, one of the careful observers and recorders of animal behavior: "Many starfish, sea-urchins, and brittle-stars develop from the egg into a larva utterly unlike the parent. In place of the firm radiate body sluggishly moving on the solid ground, the larva has a transparent two-sided body drawn out into tentacles and fringed with cilia by which it glides easily through the water, and drinks as it swims. For weeks to come, its life is amongst the sunlit layers of the ocean where it jostles with the hosts of plankton. Such larvæ lead a double life. They are almost dual animals, for there grows out of their left side a 'cœlom' . . . which is almost as foreign to the rest of the larva as a parasite. This sac has within its sphere of influence a portion, and a portion only of the larva. Around it the tissues are moulded into the form of the future star of echinus, whilst beyond that modifying influence the larva still pursues its own devices. Presently the star within it acquires a mouth, a nervous system, and locomotor organs, whilst the larva on which it hangs has still its own mouth, its own nervous system, and its own ciliated bands. This organized growth, however, soon exhausts the larva that bore it . . . and the larva is presently depleted of all its material in order to feed the growth that is, as it were, imposed upon itself. The birth of Eve is no stranger a story than is the development of a starfish or sea-urchin out of the left side of a larva." [2] An-

[1] *Ibid.*, 110.

[2] F. W. Gamble, *The Animal World*, 210–11.

other passage affords an equally good illustration of a somewhat different character. The author says, "There are some remarkable parasitic Crustacea and certain of the lower worms which attain two periods of maturity under diverse conditions of bodily development. Early in life and at a stage of development that seems to promise a high grade of organization their growth is arrested and they become males. Then degeneration ensues, the plan of organization is lowered and though growing in bulk they become less and less highly organized and in this state become female." [1]

He continues, "It is an axiom in zoölogy that sessile parents have active young. Consequently the structure of the young stage is adapted to an entirely different life from the one that it will adopt later on. It swims or drifts freely, now nearer the surface, now at a deeper level in order to keep in touch with the oscillations of the minute animal and plant life upon which it feeds. Frequently this food of the young is again different from that of its parents and new means of catching, digesting and absorbing it are required. The result of these adaptations is a creature so different (apart from size) from its parents as to deceive even the elect; and it is only by actually breeding the barnacle, the oyster and the sea-mat, that the connection between their active free-swimming young and the sedentary mother can be realized. Such animals are said to have a *larval* stage. The organs of the larvæ or free-swimming young are not converted directly into those of the adult stage. They are needed for one mode of life and conform thereto, but they are not suitable for the later habits. Hence a more or less violent change is effected and this change is called metamorphosis. Metamorphosis is accompanied by the assumption of adult habits. The active swimmer touches a rock, floating log, or ship's hulk and after fixing itself becomes transformed into a totally diverse sort of

[1] *Ibid.*, 176.

creature with sedentary habits and little intercourse with the moving world around it. Instead of drawing itself through the water, it now draws water through itself." [1]

These transformations of the lower animal structures taking place in the developmental process seem to be even more obviously conditioned by inherited tendencies or traits than are those earlier noted as characteristic of man. Yet apparently even they are not wholly the product of inheritance in all aspects. In many cases we find new environments producing differences in coloration, size and other structural conformation more immediately than would be possible if these changes had to wait for variation on the basis of natural selection.[2] Yet the fact that certain types of structural changes can be consummated only when certain environmental stimuli or conditions are present, as in the case of a necessary rest or object for attachment for the oyster, in order that it may develop,[3] does not necessarily militate against the hereditary conditioning of such changes. The environmental factor apparently is here merely a supplementary conditioning which enables the hereditary conditioning to operate effectively.

[1] *Ibid.*, 176–8. See also p. 174 and chs. 8 and 9.

[2] For examples and citations see previous chapters; also, E. S. Goodrich, *Evolution*, 36–7; Jordan and Kellogg, *Animal Life*, 104, 153; Geddes and Thomson, *Sex*, ch. 4.

[3] This fact is illustrated by the following passage: "Our common hermit-crabs require the shelter of a gasteropod shell and are never found except in such shells. One species, however, is found bearing not only a shell but a shell crowned by an anemone which does not occur elsewhere. Another is encrusted with a sponge which gradually dissolves away the calcareous shell, and this species usually harbours a Nereid worm which is only found in this situation." (Gamble, *The Animal World*, 166.) Again, "More striking instances of such coalitions are seen in the fish *Fierasfer*, which hides itself in the large sea-cucumbers or Holothurians of the warm seas; in the coral reef fish and prawn that dive into the interior of large sea-anemones at the approach of an enemy. Even on our own coasts shoals of fry often accompany the larger medusæ that drift north and westwards in summer, and at the approach of a shadow or disturbance, snuggle under the protecting disc and lie protected by the stinging tentacles. Certain Crustacea, notably the reddish *Hyperia Galba*, also associate with the Medusa *Aurelia*." Gamble, *op. cit.*, 167. See also p. 179.

Environmental pressure does operate under such conditions, but it is usually the passive rather than the active or molding factor. In this case the hereditary factors are active primarily and therefore we speak of the resulting structures as being hereditarily determined. Where the environmental factors are the active ones and the hereditary factors are merely or primarily passive or basic, we properly speak of the resulting traits as environmentally produced or acquired.

It must be clear from the foregoing that, while the sum total of hereditary traits is received at the time of the union of the two parent cells, these hereditary traits are constantly unfolding or developing throughout the developmental period of the life of the individual organism. The individual at the point of fertilization is but a single cell and certainly cannot then be spoken of as mature from the standpoint of its unfolded inherited structure. But the rate of unfolding of these inherited traits is not uniform throughout the developmental period. On the contrary this unfolding goes on at a constantly decreasing ratio. Take a single instance, that of growth in weight, which is probably very largely conditioned hereditarily. The following table shows both the observed and calculated weights in ounces of infants:[1]

[1] Feldman, *op. cit.*, 251.

Age of infant in months	Weight in ounces		Increase each month	
	Observed	Calculated	Observed	Calculated
0	127	127	—	—
1	155	156	28	29
2	187	180	32	24
3	206	206	19	26
4	224	230	18	24
5	254	254	30	24
6	270	273	16	19
7	287	288	17	15
8	300	301	13	13
9	311	311	11	10
10	326	319	15	8
11	333	325	7	6
12	330	330	3	5

The same general facts are illustrated by the following figures quoted from His by Feldman, referring to the unborn human embryo: [1]

Months	0	1	2	3	4	5	6	7	8	9	10 at birth
Length in mm	0	7.5	40	84	162	275	352	402	443	472	490 / 500
Increment per month in mm.	0	7.5	32.5	44	78	113	77	50	41	29	18 / 28

As a result of this decreasing ratio of the unfolding of inherited traits, by far the larger part of them have attained a characteristic, though not a final, development before birth. By the end of the seventh week of the prenatal development of the child, or by the time when the fœtal period begins, all the organs of the body are already formed, but not fully de-

[1] *Ibid.*, 252.

veloped. Growth from this time on during the fœtal period, that is, until birth, and even afterwards, is "along lines which have already been laid down in the embryonic or organogenetic period." [1] All of the ductless glands are also formed and are producing their secretions before the point of birth.[2] In fact the child is already functioning, however imperfectly, in most of the organic ways in which he will ever function when he is born. But mentally and in the higher sensory processes, he is not yet in any large measure developed, and in some ways as regards the mental aspect of things he is developed scarcely at all. The infant is practically a spinal animal,[3] or as Paton puts it, "At birth a human being is practically brainless, all the higher functions associated with the cerebral cortical centers being still undeveloped." [4] The child is deaf [5] at birth and his vision is defective and accuracy in its use must be developed through experience.[6] But in other respects, especially as regards the vegetative and reproductive functions the child has his external structure mainly formed. However, he has not yet in most cases developed the neural connections—the main instinctive and habitual structure—for using this external structure and organization. The child is not, of course, structurally mature or complete in any of his outward or surface characteristics at the point of birth,[7] but relatively he has advanced a long way towards that maturity—much further in fact than our disturbed perspective (due to our seeing the child after birth and not before birth) ordinarily leads us to suppose.

[1] *Ibid.*, 7.
[2] *Ibid.*, 186.
[3] *Ibid.*, 557–8, 569.
[4] *Human Behavior*, 133.
[5] However the auditory nerve is fully developed at birth. Feldman, *op. cit.*, 619.
[6] Feldman, *op, cit.*, 239, 603–4.
[7] *Ibid.*, 164, 165, 167, 169, 171, 173–4, 178, 180–6, 233, 557, 572, 616–17, 633, etc.

The causes of this maturing of characteristics are somewhat under dispute. Some hints for such an explanation may possibly be obtained from a study of the causes of the aging of individuals. Minot [1] maintains that the approach of old age is due to increasing cellular differentiation and specialization, while Metchnikoff [2] contends that it is the result of the increasing activity of phagocytes. We may assume that both of these processes—cellular differentiation and phagocytosis—are largely the result of environmental pressures, at least in the postnatal period of development, and possibly in the prenatal period also. In this way the demands and influences of the environment ultimately destroy the somatic organism which has grown up around the reproductive cells as a conservator and aid to the continuation of the life of the germ plasm,[3] when that organism is no longer necessary to insure the perpetuation of the germ.[4] Unquestionably other factors,

[1] C. S. Minot, *The Problem of Age, Growth and Death.*

[2] *The Prolongation of Life.*

[3] W. D. Henderson, *Biology*, 84.

[4] The signs of old age are briefly summarized by Henderson as follows: "With increasing old age we find changes in the body that are usually called atrophy. This atrophy occurs in all the tissues and organs, and is usually accompanied by loss of the cellular tissues and increase in the fibrillar, and also by a decrease in the activity of all the parts. In the old we may note some loss of memory, less readiness in grasping new facts and in pursuing new lines of thought. There is often also a marked tendency to remember old and far-off things, a token of the characteristic loss of the old. If we turn to the facts that an examination of the body reveals we see everywhere this atrophy of the parts, faintly indicated in one organ, more strongly marked in another. Many parts of the skeleton are in youth cartilaginous, but in the old most of these parts are replaced by bone, and though this displacement by bone indicates an advance in structure, physiologically it is far from advantageous, as it represents a loss in elasticity. The change in the structure of the bones themselves may be regarded as an advance in structure, but again it is disadvantageous, as it marks an increase in fragility. In the digestive organs the stomach may be small; the minute glands in the walls are usually fewer in number and consequently less efficient than in the earlier stages. The muscular layers of the intestinal walls are thinned, and this lessens their peristaltic action. The lungs become stiffened; the walls between the airspaces become thick and hard, and the air-capacity of the lungs becomes diminished. The heart is usually enlarged, but its power is impaired, and the pulse-rate is thereby increased. We see also that

such as the form of the maternal organs and the distribution of the cytoplasm of the parental reproductive cells, and the chromosome content itself, also help to determine the form and composition, as well as the functioning, of the mature somatic organism which we call the new individual or offspring—the new carrier of the immortal germ plasm.[1]

Whether these processes thus producing maturity and ultimately old age and death are traceable back to inheritance factors or to environmental pressures and conditions we are perhaps not yet able to say. However, it is possible to find partizans of either view. If we state the proposition in another way, we may ask whether if environmental conditions were favorable would we continue to develop indefinitely and never come upon old age and death? This implies, in case of an affirmative answer, that environment is the factor producing maturity of characteristics. On the other hand, it is maintained that the maximum length of life and the behavior of tissues at various developmental stages are fixed in the heredity determining our somatic organization. This may be so, but it is difficult to see from the standpoint of the inheritance of unit characters how such hereditary determination could be accomplished in any direct way. It seems more likely that both heredity and environment play important rôles in the maturing process, the development of hereditary structures conditioning each other and thereby gradually limiting further

---

the germ-cells cease their activity in the very old, and so one of the great functions of life is blotted out entirely from the history of the individual. The whole of the nervous system suffers, and the brain itself shows us without a doubt that after maturity is reached, the shrinkage of the brain begins, and continues steadily to the very end of life. Physiology also shows us that the shuffling gait, the tardy response, the slow speech, the imperfect sight, and the difficult hearing, are but signs of lessened power in the muscles, of diminished control over the action of these muscles, of inferior coördination, and of nerve decay."

[1] Recently much has been made by some physiologists of the influence of the endocrines upon the form and development of the unborn organism, and later upon tissue decay and death. The chemistry of the endocrines may be assumed to be in some measure susceptible to environmental determination.

development and bringing the growth and formation of the organism to a standstill within the limits of the symmetry which is implied in or imposed by the inherited structures of the mutually adjusted and restraining tissues and organs, while the environmental pressures finally clog the tissues with foreign matter and stimulate the phagocytes to excessive and destructive activity and thus prevent their normal functioning, and ultimately produce organic dissolution. This statement is, as will be seen, really in large measure a synthesis of the views of Minot and Metchnikoff as applied to our own particular problem.

All of the cases of delayed development which we have so far cited and explained have been of very simple biological structures, such as we might expect easily to be determined in the germ plasm as unit characters and which might readily be determined in the coördinating processses of physical development or growth. But may we not extend this principle of delayed development of hereditarily determined traits to include complex activities and structures which are ordinarily characterized, descriptively in terms of their social significance? In fact, it is difficult to see what justification we can find for speaking of such complexes as the collecting, maternity, reproductive, religious, altruistic, pugnacious, constructive, and numerous other group activities, as instincts on any other ground than that they are delayed developments. They certainly are not developed in the child at the point of fertilization nor at the point of birth. Some of them develop round about puberty or in some other general age period. But no one of them has a fixed point or period of appearance. This fact of variation of the ages at which these several reputed instincts make their appearance in the individual would not in itself be so significant, provided the range of age at which they appear were not too great, for we know that variations in such environmental conditions as temperature, moisture,

light and fertility cause some degree of variability in the time of the appearance of fruit on a tree or of the metamorphoses of insects. Yet there are limits of time periods beyond which the variability in development cannot go without justly exciting some degree of suspicion with regard to the supposed inherited nature of the resulting phenomena.

A much more significant factor in relation to this question of the hereditary or environmental determination of these organizations of complex activities so often called instincts is the fact that no one of them is definitely and necessarily correlated with any other organic change or process in the individual. The correlation with certain environmental conditions is much more striking and obvious. For example, boys usually learn to fight (or develop the pugnacious "instinct") in the first six or eight years of their lives, or even earlier. But there is no better evidence that there is a definite organic and age correlation here with the development of fighting propensities than that the boys have developed (learned) through the conditioning influences of environmental pressures certain elementary movements which they can carry over with some modification and apply to fighting. That is, fighting may be a complex of acquired activities conditioned by the development of certain elementary constituent or contributory movements and organization instead of an inherited activity process or organization. On the other hand, we find that the chances that a boy will develop the fighting activity depend directly upon the chances he has of coming in contact with environmental conditions which promote fighting. Some boys never develop it, although the preliminary coördinated movements have been previously acquired; for they never have sufficient external occasion to form the habit. Boys who live in a rough social environment and are crowded closely together, where space and the apparatus for play are limited, learn to fight at a very early age,

while others with well regulated environing or social conditions and without the necessity of competing for the means of play and expression delay fighting much longer or omit it altogether.

Even the reproductive activities, which cannot be successfully performed until puberty is reached, are not definitely correlated with this organic change. Their connection with it is negative rather than positive. Environment has much more than the partial physiological readiness of puberty to do with the development of the typical reproductive acts. Under our fairly closely regulated society many individuals never perform these acts and a larger proportion of the population do not perform them until long after the period of puberty. Others still, receiving the stimulus from a vicious environment, learn to go through practically all of the reproductive acts, except generation, years before puberty has arrived to make the completion of the process possible. In our society the time at which the act occurs depends far more upon the incidences of such environmental factors as marriage, temptation or opportunity, custom, economic condition and the like than upon any physiological condition. And yet many writers speak of this series of acts, which, because of their social significance, we group together and call reproduction, as an instinct. However, no one could or does perform this series of acts without having learned the method, either through imitation or experimentation. Are, then, these acts instances of delayed development of inherited traits or unit characters, or are they instances of acquired traits induced by environmental pressures and, in part at least, constructed out of inherited conditioning organic structure and activity organization and in part out of acquired conditioning neural structure and organization?

To answer this question adequately we must fall back upon the question of fact on the one hand and upon that of logical probability and possibility on the other. This was our resort

in the preceding chapter. First, as to the question of fact. In the case of reproduction, few if any of the acts of human beings leading up to it are performed in connected series without learning. Yet, unless these acts were so performed it is difficult to see how reproduction could be spoken of as an instinct. It is the complexity of the act as performed by the higher animals, especially man, which makes the hereditary character of the act doubtful, although the hereditary or instinctive nature of many constituent elements or reflexes may be sufficiently demonstrable. Among some of the lower forms the series of acts which eventuate in reproduction seems to be purely tropic. For example the frog spawns in response to a purely biochemical stimulus and, in so far as we know, without consciousness of the relation of his act to the member of the opposite sex who also contributes to the reproductive process. This tropic aspect is also characteristic in part of the human reproductive process, but not wholly, or perhaps even mainly, so. The discharge of semen or the flow of the "libido" and the descent of the ova occur automatically under certain biochemical conditions which are conditioned by hereditary structure. Both male and female respond to certain tactual stimuli in a purely instinctive way also, and various biologists speak of the clasping movement as being instinctive in lower forms.[1] Once conception has taken place the development and delivery of the offspring proceeds on a hereditary basis and would occur if the mother learned nothing regarding the processes involved. Among the human species, as well as the lower animals, certain sex odors, and possibly the sight of primary or secondary sex characters, tend instinctively to draw the two sexes together in a general way once they have developed the technique of locomotion.[2]

[1] See for example, Geddes and Thomson, *op. cit.*, 63.

[2] McDougall thinks that there is an instinctive tendency for the male to be attracted and excited by the secondary sex characters of the female, even to the point of looking for the primary sex organs and thus being attracted by the

But with all these preconditions there is nothing inevitable or automatic about the occurrence of the act of conjugation itself, and much less about the total process of reproduction. All or most of these purely instinctive activities are quite frequently produced in homosexual contacts and in autoerotic activities before they find expression in heterosexual contacts. The final steps and the series of acts which we denominate reproduction are *learned*, not inherited, just as the abnormal homosexual and autoerotic sexual acts are learned. Reproduction has a large instinctive content. That is to say, a large proportion of instinctive units must enter into the series of acts alongside of the learned units to constitute the completed process which we have learned to state synthetically and abstractly as reproduction. The instinctive units of the series may, and frequently do, occur quite independently of the total process. With the development of contraceptive methods they may occur nominally but not actually in the reproductive process or series, that is, without reproduction, the fact which has given its name to the series of acts supposed to be instinctive. Thus the series of acts known as reproduction is both organized and disorganized under the conscious direction of man.

The question may be asked whether a series of acts so necessary to the maintenance of the race would not presumably be an instinct. Such a question is beside the point of fact and therefore not pertinent. It posits an anthropomorphic and teleological assumption of what is reasonable or "ought" to be, which has no place in science because of the liability of the mind to subjective bias. But since such a method of reasoning apparently has had much to do with predisposing us

lower part of the body and pelvic organs of the female. *Introduction to Social Psychology*, 8th ed., Supplementary ch. 2. I think, however, this attraction of the female parts for the male is mainly or wholly due to his acquired recognition of their relational significance.

to believe in this and similar reputed instincts, it seems well to answer the question. We may even grant the contention of the defenders of the argument that the instinctive units in the reproductive process were selected into sentient animal life because of their value in promoting reproduction and thus the survival of the race. The answer must be made on another basis, that of the development and function of regulative intelligence in man. Among the lower animals which have not the capacity to acquire or learn complex series of acts, the reproductive process is purely instinctive. In many cases it does not even call for conjugation. Where conjugation is necessary and the process remains instinctive it is sufficiently simple that it can be performed on a tropismatic basis. In man, however, other activity and survival needs have so complicated his structure and changed the position of his body and thrown about it such complex protective coverings in the form of clothes, at once breaking the force of instinctive sex stimuli and hindering instinctive sex responses, as to make conjugation impossible on a purely tropismatic basis. It would not be true to say that other functional needs are of greater importance to the survival of the race than that for reproduction, but it is true that they are of greater importance than the need of purely instinctive reproduction, thus causing man to remain at such a low level of development that reproduction could continue to take place tropismatically. And this is true because man can substitute intelligence and learning as an aid to reproduction to supplant in part the instinctive control of this process. Therefore his structure was altered to meet these other functional needs which arose in the process of evolution and produced an acquired adjustment mechanism and even a directive intelligence to supplement and sometimes to supplant instinct in control.

So much space has been given to the analysis of the series

of acts known as reproduction for the purpose of showing that it is not an instinct delayed in its development, because it is one of the best cases which the instinctivists have to support their theory. This series of acts has a larger purely instinctive content (considered as separate units or instincts) than almost any other so-called "instinct" of the complex or socially defined sort. There is therefore a distinct tactical advantage in showing that the activity units in the series which organize the truly instinctive and the learned elements into a coördinated series which results in what we call reproduction are consciously or subconsciously learned or acquired factors. In the case of man at least it is intelligence which transforms the instinctive acts from mere expenditure of energy, however satisfying subjectively they may be, to a position in which they function in race perpetuation. In the case of man also intelligence is used to devitalize and render sterile, by means of what is popularly known as "birth control," the acts which the instinctivists call reproduction. Without this conscious control factor reproduction would not take place, nor without it could the results which nature has provided for in the complete act be frustrated. Hence the process in either case is not an instinct, but an acquired adjustment, though it is more nearly instinctive in the former than in the latter case.

Perhaps the activity complex, also commonly reputed an instinct, which has the next largest content of instinctive units is maternal care—the "maternal instinct." This supposed instinct consists of innumerable acts which relate the mother to the child almost from conception till she ceases to think of it through separation or until death intervenes. The most important organic elements in this activity complex are carrying the child before birth and feeding and cleaning it after birth. All of these are mainly instinctive in their

simple forms, though it is certain that not every child could nurse without the conscious and purposive aid of the mother. Out of these close relationships develops an affective or emotional attitude which permeates the many things the mother does for the child in its postnatal developmental period. Among animals lower than man these three functions constitute almost the whole of the instinctive services of the mother to the offspring. Cleaning it by licking is probably tropismatic. But teaching it to play and to fight,—which some mothers, for example, among dogs and other higher types of animals do—is in the main a learned activity. It would be absurd to suppose that what the human young has to acquire through the learning process could be taught instinctively. The human mother does innumerable things for the offspring, the aggregate apparently having increased with the growth of knowledge and comfort and the limitation of offspring. It needs no argument to prove that the acts of bathing, of modifying milk or of making clothing for the young are not instinctive. The general arguments of the preceding chapters are pertinent here in controverting any such chance assumption. Yet the whole of maternal care is spoken of as an instinct, developing somewhere about puberty, or even earlier as shown by the tendency of girls to play with dolls. Even the lowest savage mother must take thought to care for her child, though much—possibly most—of what she does is instinctive. Among civilized peoples only the barest rudiments or foundations of child care are instinctive acts.

The answer to the supposition that the other activity complexes mentioned in this chapter, and others still which are listed in other chapters, are instincts delayed in development may be found in the discussions of the subsequent chapters dealing with activity complexes miscalled instincts. The learned content in each of these supposed instincts is suffi-

ciently obvious to enable the question of fact, as well as that of probability, to be answered with little or no confusion.

We may now turn to the consideration of the questions of probability and possibility in connection with this discussion. A true instinct merely delayed in its development may usually be distinguished from an acquired characteristic arising from some particular environmental cause or pressure by observing the method and time of its appearance and the immutability of its character. For example the genuine sex instincts appear at the stage of puberty, which may be hastened or delayed to some extent, by environmental conditions. The nature of these instincts cannot be modified by environmental factors, although the time of appearance to some extent can be so modified. For example, the discharge of semen, the giving of milk to the sucking child, the menstrual processes and the vaginal contractions in orgasm are always typically the same processes, regardless of what the environmental situation is. There is a definite structure determining the functioning of the instinctive act and the limitations of this structure cannot be exceeded. The structure may itself in some cases be modified, and therefore the functioning may be changed, but in such cases both structure and function cease to be purely instinctive. Their end and purpose and form have been modified by forces from without which are unknown to the chromosome content of the reproductive cells. A clearer cut illustration is perhaps to be found in the growth of some plant, as for instance that of maize. No matter what the environment of the maize may be, how poor or fertile the soil, whether humidity is great or small, or what the degree of cultivation is (so long as the environmental conditions make possible the development of the plant at all) the product will be true to type. That is, the inheritance elements will not be changed. The maize will not be transformed to weeds,

nor to wheat, nor to some other plant because of environmental conditions or pressures.[1] The plant either remains and becomes maize or does not develop at all. When it flowers, the type of flower is that of maize and when it fruits the resulting grain is the ear of maize. The environment, however, has its proper effect upon the plant. It may hamper its growth even to the extent of preventing its flowering and fruiting, or it may cause the ear to develop into a mere "nubbin." On the other hand, the stalk when grown under proper conditions of moisture, fertility, temperature and light will develop to a good size and produce an ear in which all the grains are filled out to relative completeness. But in all cases the product is maize and nothing but a series of changes in hereditary selection can produce anything else from it. And the same is true of the truly delayed sex instincts such as were specified in this paragraph. They may be modified in minor characteristics of operation such as volume, intensity, frequency, and the like, but they can never be changed in type or kind, if they are truly instinctive.

The above example refers to purely biological characteristics and may be duplicated in many instances. A Jersey cow remains true to type regardless of whether she is fed on clover or corn and her offspring will be Jersey (provided her breed is pure and if she be mated with a Jersey bull). Pure-blood negroes produce the same offspring and no sort of environmental manipulation will make them otherwise so far as their biological traits are concerned.[2] On the other hand, social and moral and intellectual traits may be easily modi-

[1] Popular traditions and beliefs do impute such changes of kind. Among many farming communities there is still prevalent the belief that wheat will turn to "cheat" or tares when too heavily pastured in the autumn or early spring.

[2] Even if the findings of Boas' studies on change in head shape in the second generation of immigrant stocks and similar studies be accepted they do not alter the truth of this proposition.

fied, even be obliterated and replaced, by properly controlling the environmental pressures. The social characteristics of a Booker T. Washington or of a Principal Moton, to select an example of pure negro blood, apparently cannot be distinguished from those of the white man reared in a like environment. Socially, intellectually and morally they classify with Anglo-Saxon rather than with native African civilization, if indeed we may presume to generalize either type of civilization under such broad descriptive captions. Likewise, we have numerous illustrations of the fact that certain environments abound with criminality and other abnormal social and moral conditions. Long ago the social workers discovered that social traits were distributed by communities and economic conditions (power to purchase the normal conditions of living) rather than by race or other hereditary correlations. They found that those sections of cities which housed people of low income, which afforded poor educational and recreational facilities and more especially were provided with inadequate sanitary equipment showed a higher record of mortality, morbidity, immorality, criminality, poverty and the like, than other urban areas. Of course, the extreme instinctivist will reply that such communities are formed largely on a racial or biological basis and he will accordingly attribute these traits to inheritance. But he will find difficulty in explaining why the rates of tuberculosis, criminality, immorality, etc., increase so rapidly for the immigrant who leaves the open country in Europe and takes up his abode in crowded and unsanitary tenements, and why it is so much higher for the native born in the slums than their native-born cousins in the wealthy residence districts. There is a much closer correspondence between the tuberculosis rates for diverse races under the same environmental conditions than for members of the same races under diverse environmental conditions. Where the racial factor remains the same, the social, moral, in-

tellectual and health characteristics may still change to a remarkable degree. The environment is the variable factor for these people, hence it must be the more immediate cause. Some writers even go so far as to speak of instincts characterizing people religiously, politically, and with regard to the type of sex relations, such as the Russian instinct for Democracy, the instinct for monogamy of the white race, and the religious instinct of the negroes. Yet many people without changing their race, sex or nationality, lose their religious reverence, change their political ideals and even cease to hold allegiance to historic sex attitudes under the pressure of modern city life.

The final test as to the probability or possibility of a social, moral or mental trait being inherited or acquired, we may therefore conclude, lies in connection with the question whether it may be changed in kind in the individual rather than in the group. If the change occurs in the group it may be attributed to selection, based on inheritance, if the period of time which has elapsed since its first appearance has been sufficient to permit of selection. But more frequently the change even here is the result of environmental factors and takes place as a form of social selection. Anyway the content of groups varies so readily that it is difficult to prove sufficient uniformity or continuity of personality to draw valid conclusions, merely from observing the membership, regarding the inherited or acquired nature of their traits. If, however, characteristics which are spoken of as instinctive can be educated into, or out of, an individual, the one trait being replaced by its opposite, this is pretty conclusive evidence that the activity complex was after all environmentally produced or acquired and not inherited. Just this sort of transformation and replacement by opposites is constantly being accomplished. We have built up elaborate systems for the reëducation of

maladjusted persons. People are taken out of environments in which they have developed criminality, alcoholism, poverty, immorality, disease, etc., and are transferred to other environments better supervised or artificially controlled and they lose their old social and moral traits and build up new ones; they have their characters literally made over. This making-over process is sometimes so effectively accomplished that the old environments cannot reclaim the transformed individuals to their former characters. In other cases, they tend to revert to their earlier habits whenever they are placed under stimuli characteristic of their earlier lives.

A favorite device of the instinctivists to meet the fact of such an obvious transformation of character and yet to retain the credit of the transformation for heredity is to attribute to the individual two conflicting instincts.[1] Under one set of environmental conditions, one instinct is suppressed and the other operates. Under another set, the opposite balance of instincts is secured. Such an explanation of course gives the determinative or regulative power in society or in individual conduct to environment and thereby the instinctivist becomes an environmentalist. Man remains for him merely a machine with a large number of stop-cocks (instincts). A significant change, however, is produced in the theory of their operation. The simon-pure instinctivist insists that the stop-cocks are manipulated from within, that the instinctive machinery is self-operative and self-determinative. The theory of contradictory instincts, which are suppressed or encouraged by environmental pressures, must, however, admit the assumption that the manipulation is from without. In its ultimate consequences, of course, this means the breaking down of the instinct theory of social control and individual

[1] Such as, for example, the so-called instincts of self-assertion and self-abasement. Ellwood speaks of instinctive truth telling and instinctive lying, two opposite qualities, though they do not necessarily involve opposing structures. See *Sociology in Its Psychological Aspects*, 223.

character. In this connection we may also raise the question as to whether the opposites are always structural and concrete (biological) or moral and social, that is, synthetic and abstract (environmental), antitheses. As previously pointed out, telling the truth, being religious or patriotic, and their opposites, may quite frequently have the same structure under dissimilar circumstances. In such cases we would have the peculiar situation of opposite instincts being called into play by changes in environment while the heredity (structural content) remained the same. Such a confusion is likely to occur in connection with any of the so-called social or moral instincts, because their definition is in terms of their social values or functions instead of in terms of their structure.

At this point we may supplement our argument on the basis of probability and possibility with an appeal to fact. It is usually within the range of possibility to determine whether these supposed conflicting instincts which may be manipulated by environment really are unit character organizations predetermined in the germ plasm at the point of fertilization or whether they are built up under the influence of new organizations of environmental pressures. The question is really one of how large the instinctive unit is. That the environmental organization or mold makes use of inherited tendencies in building up complex acquired characters or activity structures is obvious enough. The problem is as to how far we may push back our social analysis before we arrive at these original, indivisible, unit-character or inherited elements. The environmentalist maintains that the analysis must be pushed back a great way and that the indivisible elements or units are found to be quite minute when we finally reach them in the process of analysis. The radical instinctivist claims to find that the indivisible or instinctive units are very large and near the surface of social

conduct. If he is correct the variability of social forms and units will be distinctly limited, since acquired activity organizations within the individual are not inherited as instincts. Consequently social progress or evolution will tend to go more in a circle or at least in a spiral whose successive loops remain close together and are of diminishing circumference. If the environmentalist is correct, progress may more nearly approach the straight line curve or at least the sympodial curve emphasized by Lester F. Ward.[1] In view of the fact that the ratio of progress seems to be increasing with the passage of time the decision to be drawn from this indirect argument would seem to be with the environmentalist and to favor the hypothesis of an increasing environmental control.

Furthermore, history has witnessed an increasing degree of individualization or individual differentiation. The savages were very largely of a type, each in the main like his fellows. The whole fabric of social life was mainly homogenous. There was little division of labor or of function. Sex and age were the main dividing lines. Social evolution has been a progression of differentiation of types concommitant with division of labor and function.[2] The ancient sex and age differences tend to be overlaid, though not eliminated, by new cleavages growing out of groupings of individual differentiations. The instinctivist using his highly sophisticated social activity complex criterion of instinct, would have discovered relatively few instincts in the primitive individual, for there would have been manifest but few types of activity or of personality so highly developed. On the basis of the same process of reasoning, modern society must display an inconceivable multiplication of instincts, as evidenced by the great mass of analyzable and dissociable activities we have de-

[1] See his *Pure Sociology*, 71 ff.

[2] See E. Durkheim, *De la Division du Travail Social*, for discussion of this point.

veloped.[1] Yet most of these new types of activities have not appeared in the world until recently. Shall we conclude therefore that instincts are, logically speaking, constantly being hatched anew out of nothing? Or shall we assume that older units of activity, some of them inherited and indivisible, but most of them already complicated combinations of indivisible activity structures or patterns, are constantly being combined and recombined into countless new adaptive organizations of activity in response to the pressures of environment? The latter seems to be the more likely explanation of the genesis of differential individual character and of the highly complex social activity organizations of our day. In the light of such an explanation, most of the cases of reputed delayed inheritance of activity complexes are seen to be merely instances of delayed character development under the control of environment. The delay in character development occurred because it had to await the appearance of certain other aspects or processes in civilization as the indispensable condition to its own organization. The ever-expanding social environment calls constantly for new organizations of the old simple innate or acquired activity units into new character complexes to serve as adjustment mechanisms. These character complexes are not themselves inherited but they are built anew for each individual who needs them for adjustment purposes. They are imposed, so to speak, by his environmental pressures, either physical or social, although his own simpler inborn traits contribute their share to their content.

The argument regarding delayed instincts has so far been directed against the acceptance of the view that the general activity complexes and values, such as reproduction, maternal care (maternal "instinct"), fighting, and the like, should be

[1] Such a hypothesis would appear to have the support of current usage as evidenced by the findings set forth in Chap. IX.

regarded as delayed instincts. They should rather be called delayed habits of action and of thinking, either the one or both. But apparently there are delayed instincts. These are relatively simple inherited, or apparently inherited, stimulus-response processes, which develop their synaptic connections late because the organic preconditions are not earlier present to enable them to develop sooner. Examples of such delayed instincts are the great group of instincts connected with the functioning of the sex organs and with reproduction and locomotion. The secretion and discharge of the sex fluids, tumescence and detumescence generally, menstruation, the acts or processes of conception, of which there are many, are among the reflexes and chains of reflexes which we may call delayed instincts. The child does not walk or crawl until several months after its birth, and then it makes the necessary neural connections—sometimes rather quickly—which enable it to perform coördinated movements which we call locomotion. It is sometimes difficult to determine whether such delayed neural connections are acquired from environmental pressures or whether they are the result of chromosome determination. Apparently there are elements of both sorts involved.[1] Skill in walking is obviously mainly acquired, but also it seems likely that the suddenness with which certain neural connections which are essential to walking are made indicates that their development is conditioned by inheritance factors. This double source of development is even more patently the case in connection with language. Vocalization has at least some sort of inherited basis, apparently, even if it is nothing more than random expression, similar to random muscular and skeletal motion, proceding or resulting from the processes of

[1] There is, of course, also the possibility that such incomplete mechanisms as that of walking represent vestigial instincts—instincts which were organized in the inheritance of the lower animals but which have been disintegrated under the influence of protective maternal care. See discussion below.

metabolism. But the forms which vocalization takes, especially the elaborate forms which have meaning correlations and which we call language, are acquired. We must speak of habits of locomotion and of language, but these habit organizations evidently contain reflex or instinctive processes which are of great importance in assisting the habits to become formed. And these and many other inherited constituent processes are sometimes delayed in their appearance.

In fact, practically all of the processes which we observe as reflexes or instincts are delayed in their appearance and there is therefore a sense in which all instincts may be said to be delayed instincts. This is because none of the processes which operate visibly in the postnatal period develop at the point of conception. They come one by one as the development of the organism unfolds. The vegetative processes, sense perception, locomotion, reproduction, develop gradually from the early stages of cell division on through the embryonic and the fœtal stages before birth and until the maturity of the organism is reached many years after birth. The external body structure for these processes is formed before birth, but its organs and organization do not reach their final form until long after birth. The neural structure or organization which is to control the operation of this external structure in the adjustment process is, however, formed much later. A very large portion of the neural connections are not made until after birth, and this is true especially of the higher control connections in the upper part of the brain. The conscious control connections of the brain are made last of all, the process of making the connections going on throughout life. It has even been estimated that possibly some hundreds of millions of potential neural connections or organizations are never made in the brains of every one.[1] The inference is that

[1] M. F. Meyer, *The Psychology of the Other One*, 140–1.

the organization of the environment has not been such as to call forth these neural connections and the neurones go unused in these relations.

The fact is, therefore, that all activity and thought processes come into organization gradually. All are delayed in organization and operation, but some are delayed more than others. The development of one process is dependent upon the development of antecedent processes within the organism; but it is also, at least in many cases, dependent upon the development of other antecedent processes outside of the organism or in the environment. As yet we are not able to determine with accuracy just what internal processes are dependent upon antecedent internal and what are dependent upon antecedent external processes. But an even greater difficulty is to be found in determining which of these internal antecedent processes are inherited and which ones are acquired. This problem has already been discussed in another connection, where it was shown that we do not yet know what influence this antecedent determination of organic internal processes has upon the question of the relative importance of heredity and environment as social factors. But if we grant that all stimulus-response processes which we cannot prove have acquired elements in them are inherited, thus assuming that at least what we now call reflexes are inherited (and the more definite and unitary of the so-called instincts belong to the same category), there is still a great field of mental processes regarding which there is at least reasonable doubt. We have already disposed of most of the complex mental and the moral and social attitudes and valuations on the ground that they are abstractions. They are either only abstract valuation or descriptive categories, representing no concrete or consummated overt activity organization whatever, or they are activity complexes with a rapidly shifting content of overt activity, much of which is manifestly acquired.

But there are certain other neural organizations, manifested outwardly or introspectively as attitudes, beliefs, points of view, emotional and intellectual slants, and the like, which it may be claimed are instinctive, although they do not develop until long after conception and birth. If the correlation of these attitudes, which represent inner neural organization, are found to correspond more definitely to typical environmental conditions than to specific age, sex, and possibly metabolic, conditions, the presumption should be against their being instinctive. But even when they appear at approximately uniform periods of age and are closely correlated with sex, thus showing that they are dependent upon inner organic antecedent developments, their instinctive character is not proven. The neurologists have shown us that neural connections of types never before made, because the conscious content or accompaniment had never before existed, are produced, even in the adult brain, by the growing out of neural processes until axones and dendrites meet.[1] In the young child, before and after birth, these extensions of neural processes, building up neural organizations or structure, which makes it possible for the organism to function more accurately in a new adjustment situation, occur very frequently. Also many minor connections between mature axones and completed dendritic processes are being constantly made in great numbers. Apparently the relation of a dendritic "brush" or group of processes to the axone may undergo frequent and marked modifications in a relatively short period of time. These dendritic processes extend and retract themselves like amœbic pseudopodia [2] under the influence of chemical conditions in the brain. What is the relative importance of hereditary and environmental determination in making, breaking and modifying these connections which constitute

[1] C. J. Herrick, *Introduction to Neurology*, 44 ff.
[2] *Ibid.*, 111, for a statement of this view.

the neurological basis of the attitudes or thought, and ultimately of centrally controlled action, it is not now possible to say. But we do know that the part of environment in this connection is very large, in some cases apparently predominant. We know, in fact, that there is a very close correlation between the type of the attitude and the character of the psychosocial environment, especially with regard to ideas, attitudes and beliefs. But what are the biochemical and biophysical mechanisms, by means of which the environment can organize the inner neural structure, we do not yet know.

CHAPTER XIII

A REDUCTIO AD ABSURDUM

Some of the writers on heredity and eugenics refer to the most complex social and moral attitudes and characteristics as inherited. Many examples of such treatment have already been cited in previous chapters. Mr. C. B. Davenport lists 102 traits as hereditary in human families.[1] Some of these traits are confessedly social in character, that is, they are synthetic mental and moral characteristics representing a learned adjustment of the individual to his psycho-social environment, and therefore primarily social and only secondarily biological in character. Instead of representing definite internal biological unit structural organizations which remain constant, as instincts or inherited traits necessarily must, they represent varying syntheses of biological (predominantly neurological) complexes and dispositions which have only a nominal constancy, one which exists in their meaning rather than in their structural organization. That is, their unity is a varying unity with regard to the time and space elements and we are able to give them a constant or permanent title only through a process of abstract or conceptual syntheses of functions. Their unity and identity are social and conceptual rather than biological.

Take, for example, the fact of criminality, which Davenport speaks of as being inherited[2] and which many other writers, especially the criminologists, list among the instincts or "born" traits. It must be clear upon reflection that criminality is an abstract class term and does not represent any one

[1] *Heredity in Relation to Eugenics*, ch. 3.

[2] *Ibid.*, 83–92.

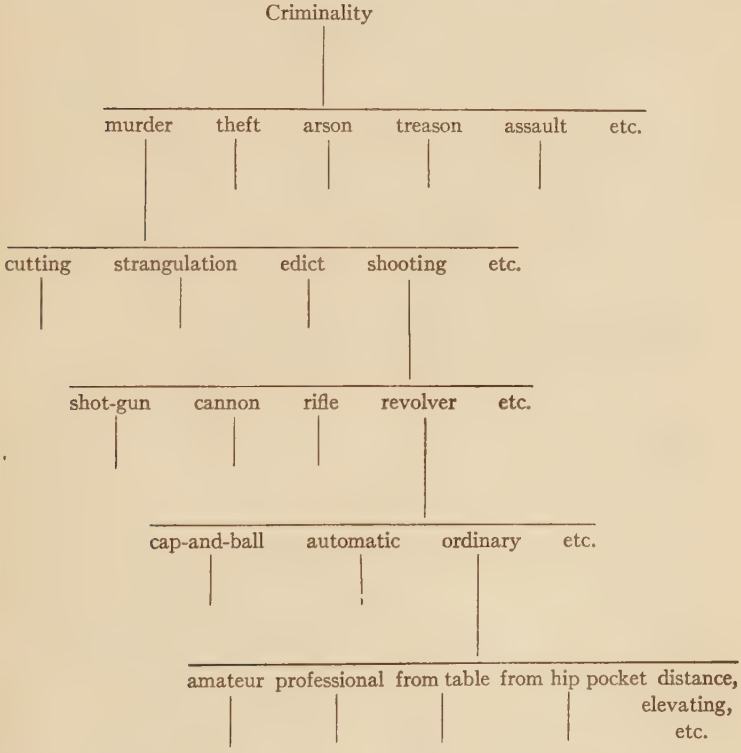
concrete act or neuro-muscular organization. It stands for an abstract synthesis of a great many acts of a certain social (not biological) similarity, that is, acts having a certain common element of meaning or social adjustment significance. Even this similarity of meaning is social, or abstract and synthetic, rather than concrete or biological; for exceedingly dissimilar acts from the standpoint of their biological and physiological nature and organization are classed together as criminal. They are grouped thus together because they produce similar social effects and therefore have similar moral values when reflected upon abstractly. Crimes may be committed by a stroke of the pen or by a stroke of the arm or foot. Criminality may be simply an act of omission, involving merely a neural complex and no positive overt act apart from the daily routine; or it may consist of the most diabolical physical acts, such as poisoning, bombing, shooting and the like. The particular neural complexes and muscular responses involved in these several acts may be altogether different, in fact would almost necessarily be different. It would, therefore, be absurd to group all of these acts together as a single unit biological character which is inherited as such and which we call criminality. And yet that is just what is done when one speaks of criminality as inherited or instinctive or of the "born" criminal, as the writers on criminology so frequently do.[1]

The fact of the great complexity and diversity of the acts classified as criminal can be well illustrated in the diagram on page 307:

To begin with, we observe that there is a great variety of major or code classifications of crimes, such as murder, theft, arson, treason, assault and battery, defaulting, obtaining money under false pretenses, indecent exposure, rape, libel,

[1] The number of writers who still speak of the "born criminal" is large, although there appears to be a growing conception of the inappropriateness of the term. See C. A. Ellwood, *Sociology and Modern Social Problems*, 3d ed., 327 ff.

obscenity, etc., etc. All of these classes of criminality differ greatly from each other in the types of neural organization and mental content, as well as of muscular execution and accessory implements and technique utilized in their per-



formance. Therefore, as pointed out above, they cannot be grouped together as a single unit act. Hence the necessity of speaking of criminality as an abstraction, as a synthetic or social and moral unity rather than as a biological or structural unity. But it should also be noted that these particular types or classes of crimes, such as murder, theft, arson, are not themselves concrete or unified biological types of activity.

They also are abstractions representing social and moral unities or similarities synthesized on the basis of a social or moral valuation rather than on the basis of a biological and structural identity. They are made into a common whole through the process of assembling a great many acts, not biologically but sociologically and morally (that is, abstractly) related, into one common group and covered by a common term, because they possess a similar meaning or value for society.

The truth of this contention can be illustrated by taking one of the classes of crime and further analyzing it. If we select murder, for example, we shall discover upon investigation that murder may be committed through a great variety of acts and omissions. Some of these are listed in the above diagram. To these might be added many more methods of committing murder, such as burning, flaying, stoning, starvation, liming, disemboweling, making corrupt judicial decisions, desertion, defamation, etc. Each of these general methods in turn differs greatly from the others in its neural, muscular, and ideational conscious aspects. Also, they in turn are discovered to lack internal biological or neurological unity, however much they may possess social or moral unity of value or meaning. Any one of these methods of murder here set forth may, from the standpoint of the bodily or neural structure and organization involved, be subdivided into a number of sub-classes depending on the instrument, occasion, circumstance, position, etc., in which the act is consummated. If we select shooting as the type of murder which we desire to analyze into its elements, we discover a great variety of instruments by means of which one may be shot. But this analysis into the instrumental mechanisms is only one phase of the divisibility. We must also take into consideration whether the shooting was intentional or purposive, whether it was socially justifiable or not, what the other circumstances of light, position, provocation, etc., are. All of

these considerations have some effect, sometimes a profound effect, upon the final classification of the act from neural and from muscular standpoints, that is, as an act physically speaking,—the only sort of an act which can conceivably be inherited.

If we suppose the shooting to have been accomplished by means of a revolver, as is most commonly the case in times of peace, we must still discover what kind of revolver was used; for upon the determination of this fact will depend in large measure the neural and muscular dispositions, that is, the physical character of the act. A cap and ball revolver requires a decidedly different muscular manipulation as well as set of mental concomitants from those involved in the use of an automatic. If we further raise the question as to whether the act was purposive or merely accidental, we shall find that the neural correlations will necessarily be decidedly different in either and every case, for memory, accessory acts and plans and the like may play a considerable part in the act, according as it is intentional or otherwise. Likewise, the act will differ greatly whether performed by an amateur or by a professional gunman. In the one case it would have to be more carefully planned or be more truly an accident of a blundering character, while in the other case a very slight altercation might conceivably result in an almost automatic act of murder, because the nervous system was so definitely habituated to shooting as a form of argument and needed only the emotion of anger with a definite object to set it off into action. The act will also differ widely on its physical or biological side, whether the revolver is withdrawn from a pocket or holster or is taken from a drawer or picked up from a table, or whether it is gone after or sent for. Again the act must vary in nature according to whether the person fires from an elevation or depression, toward or from the light, at close or long range, and the like.

While this analysis of the criminal act might be extended even further in regard to the details of conditions, instruments, antecedents, etc., enough doubtless has been said to indicate the great diversity, neuro-muscularly speaking, of criminal acts, and consequently to demonstrate the absurdity of speaking of an abstraction, such as criminality, as a unit biological character. The value of such an analysis as this is twofold, depending upon the fact that action patterns which we call instincts are either unit characters or they are not instincts and that inheritance is biological or physical (not merely mental or moral or social) or it is not inheritance, strictly speaking. That is to say, we must inherit structures if we inherit anything. There is no such thing as the inheritance of ideas as such, certainly not the inheritance of abstract ideas or mere abstractions. That we may conceivably inherit neural structures which predispose us to a certain line of mental development will be generally admitted, and some may even contend, though rather uncritically, that we may inherit the neural structures of ideas. All scientific psychologists now accept the principle of "no psychosis without neurosis." Yet they may contend that this very principle establishes the fact of a neural structure back of each idea and therefore they may challenge us to prove that this neural organization is not, in many cases, inherited instead of acquired. If such a question is raised, we can only fall back upon the question of fact. The mere assumption that a neural disposition back of an idea or an act is inherited or acquired settles no controversy at issue. Can we through analysis or experimentation get at the facts of the case? In many instances we can.

We have already demonstrated the fact that an abstract idea (such as criminality) cannot be inherited, because neurologically it does not represent a unit act or organization. It stands for a synthetic valuation of acts with a certain similarity

of social and moral significance, when viewed in relation to certain results. It is a conceptual fact rather than an overt or neuro-muscular act. But if we cannot speak of an instinct of criminality, nor of shooting, nor of shooting with a revolver, etc., because of the abstract or general and synthetic character of such facts, may we not at least speak of some specific act of murder as instinctive, taking care to describe the act in detail? Thus may we not say that this man had an instinct to kill a man with a Colt revolver which he drew from his hip pocket and sighted or leveled at his enemy? Once stated in this form we are able to raise the question of fact. Has anyone such an instinct? It seems altogether improbable, even impossible, since Colt revolvers and hip pockets are fairly recent inventions and therefore have not had a chance to select out and broadcast generally the particular imputed instinct here described—unless we are prepared to believe in a form and rapidity of inheritance of acquired characters which would stagger even Lamarck himself.

Those who have not followed this analysis and argument closely will probably raise a question somewhat as follows: "But why do we bring the hip pocket and the make of the revolver into this matter? Cannot a man inherit simply a *tendency* to shoot?" The less critical may even go further and ask if we may not inherit a *tendency* to murder, or to kill, even if we do not inherit the structure of the act as such. These are two very different questions, although they have a common basis of misunderstanding, and they must be answered in turn. These questions must be answered because of the large number, even among the psychologists, who will ask them.

In the first case, it may be said that the make of the revolver and the hip pocket and such similar details must be brought into the matter because they are a part of the con-

ditions of the act. The source from which the revolver is obtained (in this case the hip pocket) determines the initial movements of the act of murder (if we omit the less obvious, though not less important, preliminaries leading up to this stage). The flexions of the arm involved and the balancing of the body, the coördination of the forward extension of the arm with the eye movement, the flexion of the finger upon the trigger in correlation with the completion of the arm-eye coördination, the grasping of the butt of the revolver, etc.,— all constitute one serial or chain set of neural and muscular dispositions which must further be correlated with another set of memory images, moral and social valuations, emotion of anger, computation of the opponent's probable skill, of distance, light, etc., to complete the act of murder in this hypothetical case. Since the organization and incidence of all these correlations and coördinations must shift and be different under varying conditions, we cannot properly speak of the various acts as being identical or of the group of similar acts of shooting as being a unit. Yet, such unity is necessary for the act to be an inherited one, that is, for it to be truly an instinct. If we accept, as we must, the principle that we inherit as an identical and unitary act only structures which function uniformly, that is, without changing the content or organization of the structure, we must include all these details as above described in the act which we speak of as instinctive. This is so, because all of the details are essential parts or conditions of the act. Any other structural organization means another act, unless indeed we admit that we define the act from the standpoint of its social and moral significance instead of from its biological organization. In such a case the organization of the act must be acknowledged to be social and not biological. It must therefore be apparent that it is an acquired rather than an inherited act, in so far as its organization as an act is concerned, because its organiza-

tion is external to the structure instead of identical with the unitary neuro-muscular organization. This imputation of the acquired character of the act would still remain true even though all the component structures organized into the whole of the act or adjustment complex were themselves inherited structures, an assumption in the latter case, which would rarely if ever be true. The characteristic of an instinct is that its organization, including all component structures or adjustments, as well as the component structures or psychophysical dispositions, is inherited and internally and organically organized. The fact of the external or social and abstract organization of the act deprives it of its instinctive character, making it acquired; for the definition of the act depends upon its organization.

So much is clear and will necessarily be accepted. The defender of the instinctive explanation, having thus abandoned the theory that John Smith's murderer acted because of an instinct of criminality or even because of a general instinct or tendency to shoot, may now substitute some such formula as: he acted from an instinct to withdraw a Colt revolver (previously loaded, etc., and placed in some specified position or receptacle) and to extend the arm to a position coördinating with the eye (known as sighting) and to flex the forefinger (causing the discharge). This deadly instinct to do all these things in series we may be assured caused the death of the much lamented John Smith. We may accept this statement temporarily as representing the facts. What shall we name this instinct? Shall we call it the instinct to murder by doing as above described? The followers of Lombroso and his school may be strongly tempted to do so because of their penchant for the "born" criminal, and to them a crumb may seem better than no bread at all. But unfortunately the murderer of John Smith probably went through exactly the same activities in shooting at a knot on a tree before he had

even heard of John Smith and had his quarrel with him. What instinct was he exercising then? Surely it was not the the instinct to murder by means of a Colt revolver drawn from a hip pocket. Evidently we must eliminate the phrase "to murder" from this instinct altogether, unless we desire further to complicate the process by bringing in additional phrases descriptive of neural processes connected with the whole emotional and ideational content of the situation. That is, the moral or social description of the end result has no place in the description of the instinct, for reasons already fully discussed. Then our instinct would be stated somewhat as follows, abbreviating those phrases already frequently stated: "an instinct to murder by (describing the manipulation of the instrument used in the murder) upon experiencing the emotion of anger aroused by certain acts (definitely and fully stated) of the object of the anger and now recalled in memory." Or, it may be that there was no anger at all, but pity for his suffering which it seemed desirable to end or because he was insane and consequently attacking the person shooting, or some other similar hypothetical situation. In such cases we should have several instincts to murder, some of them perhaps merely instincts to kill (where no moral obloquy was attached to the deed), for they would be different acts, neurologically speaking, in the several instances.

It should be noted, however, that the completing terms in these expanded "instincts" would ordinarily represent activities growing out of new or recently developed social and industrial situations and therefore most probably not inherited acts at all. Thus the cause of the offense may have been theft of mining property or a political libel, both things of recent origin. In such cases some terms in the reputed instinct would obviously not be instinctive at all. We would not commit murder because of such offenses against us until we had learned through a process of social or environmental

assimilation to value such external objects or elements of character. We have no instinctive or inherited sense of valuation for such abstract elements of character as may be subject to libel or for such a newly devised form of property as mining stock. We have to acquire such a sense of values for these as would cause us to commit murder in their defense or as a means to acquiring possession of them. In such cases we should have the anomalous situation of describing an instinct which obviously is not all instinct. Indeed, the use of the Colt revolver and of the hip pocket was earlier objected to because of the impossibility of the activity elements centering around these objects being truly instinctive. Therefore, we may safely conclude that this whole complex structure of so-called instinct, in this particular case at least, has become top-heavy with acquired elements and must fall of its own weight.

Once complex syntheses of acts are analyzed out into their unit elements of structures and reduced to a basis of concrete neural and muscular dispositions, the problem of whether the act is instinctive or acquired becomes merely a question of fact. The fact itself is determinable, not so much on the basis of the degree of concreteness and unity of the act as on the basis of whether the act is known to have been learned or acquired and whether it is possible from the standpoint of past social history for this particular structural complex of neurons and muscles to have been selected into the hereditary traits of the type and broadcasted to a large section of humanity. Granting that the possibility of selecting such a structural organization into the hereditary equipment of the individual and its broadcasting, as, in some of the simpler cases, may be maintained with a considerable show of truth,—at least with respect to the selection if not with respect to the broadcasting—then we should expect to find the human animal possessed of a number of instincts almost beyond

comprehension. Consider, for instance, how many criminal instincts, or instincts which could at least be used for criminal situations, could be fashioned from the analysis of criminality above constructed. But we have already shown, at least by inference, that most of the concrete serial acts isolated in that analysis could not possibly have been inherited, social evolution being what it has been. The same may presumably be said of the results of the analysis of any other abstract or synthetic social attitude, such as morality, religiosity, love of democracy, and the like, into its concrete activity contents.

If the serial act (such as the one described in detail above), as it appears in its final analysis, is not truly inherited or instinctive in its complete form, may it not at least contain some instinctive *core* which gives general direction to the act? it is often asked. The answer here depends on what is meant to be included under the term *core* and how much directive power is assumed for it. If it is some metaphysical or mystical entity which is conceived of as directing the act, but which cannot be reduced to anything definite and concrete like a neural correlate or neuro-muscular or neuro-glandular or other structural disposition, then the question must be dismissed, for it means nothing intelligible and definable. If, on the other hand, by *core* is meant that some important or dominant part of the act, or rather of the structure resulting in the act, is inherited, the question may sometimes, perhaps, be answered in the affirmative. But here we must guard against assuming too large a constituency for the *core.* Perhaps relatively few acts are wholly learned acts. Practically all acts contain some inherited basis or basic elements, more or less removed from the original form of activity of the organism, upon which acquired or learned adjustments are built or based. In the more complex and advanced or distinctively

social adjustments these inherited bases of structure and functioning are covered up by the overlying acquisitions to such an extent that they are not easily isolated or separated and recognized. Even in the action of murdering with a Colt revolver drawn from the hip pocket of a cowboy or other ferocious member of our species there are instinctive elements. The murderer's bodily structure is for the most part inherited, with the result that within certain limits the kind of flexion of the arm, the method of grasping the butt of the revolver, the ability to look along the barrel of the revolver in the act of sighting, are predetermined in large degree by hereditary structures, organs and characteristics. But the acts of flexion, extension, of sighting and of coördination have to be learned through the development of localization and recognition as developed through the organism's sensory equipment. Grasping is a native reflex and so is the tendency to flex the arm, but grasping and flexing with a purpose, or in the service of a willed end, as is here described, is always part of a learned process. Furthermore, the correlating of a string or group of dissimilar acts, such as has been described in this and other chapters, into a connected series having moral or social (but not inherited neuro-muscular) unity and meaning, giving rise to acts possessing social and moral significance or value, is certainly the results of learning or environmental pressures or molding, and not of heredity.

Thus it becomes apparent that the so-called *core* or *cores* of a complex act are relatively simple, as compared with the whole of the act. They are generally rudimentary, constituting merely the foundation stones of the completed structure of socially significant activities. Not only are these *cores* rudimentary, but they are also interchangeable, appearing as basic elements in a great many acts. In fact, a varying number of them appear in practically all acts. It is clearly seen that it is not these basic or rudimentary inherited

elements, common to large numbers of distinct activities, which give determinative character to the completed acts. Rather, it is the variable or learned additions that give character, that is, which separate them off in character from other acts, and it is upon the basis of such characteristics that we name the act. Consequently it is a matter of misrepresentation or confusion to speak of the act, which obviously often consists primarily of learned elements, and which is always organized externally into its unity of meaning, as an instinct.

The other general question as to whether we may not inherit a *tendency* to criminality, to saintliness, to truth telling or to lying, to religiousness, to superstition, or to some other general social or moral trait or traits, or to the performance of some corresponding set of acts (although we do not inherit the complete activity itself, or its overt structural basis) is based either upon a misconception of the nature of heredity or upon a failure to distinguish the thing inherited from the act under consideration. If by *tendency* is meant some magical or mystical internal control without concrete neural content the proposition must be dismissed as in the similar case of the *core* discussed above. It may be repeated that there is no psychosis without neurosis. Neither is there inheritance of "tendencies," which are even less tangible than ideas and abstract syntheses which we have shown cannot be inherited. However, if by *tendency* is meant, as is sometimes said, a *desire* to do that particular act, we can discuss the proposition only when we have reduced the desire to a concrete biological and actual neural basis. Now, desire is merely the vague or more or less definitely conscious recognition of the absence of an activity or adjustment which the organism is prepared or equipped for. That is to say, the desire corresponds to a neural and otherwise internal structural or biochemical organization of the individual

which at that moment is seeking overt expression but, which, because of some obstruction or inhibition, is not realized in overt action. If the inner organization seeking for activity expression were realized completely in action, without interrupting factors or "hitches" or inhibitions, all desire would pass. Even consciousness itself ceases with perfectly automatic activity. Thus the desire, considered as a biological or structural fact, reduces to a biological (primarily a neural) correlate, which is identical with the act, or the part of the act, unperformed or incompletely consummated. Whether this structural organization is inherited or acquired must be determined by the processes of analysis and investigation described above. At the same time it becomes clear that we cannot shift the problem of instinct merely by substituting the term tendency. The two problems are not separate, but identical. Both instincts and tendencies involve equally internal organization of neural structures.

Sometimes by the word *tendency* is meant some *core* or inherited unit in the structure or organization which predisposes to the act and which further predisposes toward the development of certain types of social or learned adjustments under specific circumstances. Thus people inheriting feeblemindedness or deafness or some other defect of a radical sort (assuming that such characteristics are the result of inheritance rather than of prenatal or preconceptual environmental influences—a supposition not yet completely verified) [1] may be spoken of as inheriting a tendency to criminality.[2] A person born with an unstable nervous equipment may be

[1] See tentative classification of such early environmental influences in a paper by the author in Vol. XVI of the *Publications of the American Sociological Society* (1921).

[2] Many of the writers employing the terms "instinctive criminal," "born criminal," etc., evidently have such a meaning vaguely in mind. See Ellwood, *op. cit.*, 327 ff.; also Parmelee, *Criminology*, and in fact most of the writers on criminal traits.

characterized as having an inherited tendency toward insanity. In such cases it is clear that the unfortunate person may more easily develop criminality, or insanity, for example, than would some one who was perfectly normal in his inherited physiological and neurological make-up. In the same way he would be more liable or "predisposed" to develop poverty, illness or some other radical maladjustment in society. But the correlation here is not, as is commonly assumed, an inherited one. The secondary characteristic is produced because the primary characteristic renders the possessor less able to develop a normal adjustment to the social environment, because of his handicap. What particular secondary characteristic is actually developed, out of a number of possibilities, depends upon the direction in which adverse environmental pressures warp him. Thus, it is apparent that such secondary characteristics are of environmental rather than of hereditary origin, are acquired instead of instinctive, and to speak of the inheritance of a tendency in this sense is decidedly misleading.

On the basis of the preceding analysis of a typical case of the imputation of the character of instinct to a complex or abstract quality, it has been possible to indicate some of the prevalent errors of usage in regard to instinct. The ease with which acquired habits and abstract value concepts can be confused with instincts or truly inherited characteristics has been pointed out, though only a single detailed example has been used by way of illustration. The reader may easily make a similar analysis of other group activities or abstractions or social and moral valuations which he finds characterized as instincts and arrive at similar results. In this way the absurdity of much current writing and speaking regarding "instincts," which are really social value concepts or acquired complexes of activity, can easily be demonstrated.

CHAPTER XIV

SOME FALSE INSTINCTS EXPOSED—MATERNAL, PATERNAL AND PARENTAL

In the two preceding chapters some of the activity complexes which have been named in terms descriptive of their social significance and which have been most commonly regarded as instincts were analyzed. This analysis was undertaken for a twofold purpose: to illustrate widely prevalent erroneous theories regarding instincts and to demonstrate that these particular activity complexes or series were not organized on the basis of biological heredity. They are organized on the basis of environmental pressures and they are even named after socially significant processes or functions.

In the present chapter three reputed instincts, all in the repertoire of the contemporary social psychologists and sociologists, will be subjected to an analysis and criticism in the light of the methods worked out in the preceding chapters. When it is stated that these activity series or complexes are organized on the basis of environmental pressures, it is not maintained that they necessarily originate exclusively in contemporary interests. Many of them have a historical aspect, a "social heredity," as it is sometimes termed by analogy, which often is difficult to distinguish superficially from biological heredity. Such is the case, for instance, in connection with the so-called maternal instinct. It is difficult to distinguish what the mother does for the child because of traditional or customary motives from her activities in its behalf on an experience and on an instinctive basis. All three groups or

sources of impulsions operate. Along with her inherited organic responses in yielding food to the child at her breast and in responding to its cries, go activities which in her own childhood she picked up unconsciously or subconsciously (or at least the source of which she has forgotten) by observing mothers attend to their infants, and other activities which she has learned by trial and error or which she has obtained from books, bulletins and class instruction and lectures.

This traditional element in child-care is particularly likely to be mistaken for instinct. Its acquisition is for the most part an unconscious process, or at least an unreflective one. Children are busy in their early years with imitating their elders in all conceivable practices. The child does, at least crudely, in act or in imagination, for her doll all those things the mother performs for a younger child and for her. She masters in the rough all the remedial and medicinal applications, the hygienic and sanitary processes, undertakes educational and corrective supervision over the "life" of the doll and even gives to it the same quality of treatment, in approbation and disapprobation, which she herself receives from her parents. She practices language on it and even plays games with it; assigns other personalities to it and to herself and then imitates these into her own character when there are not sufficient and frequent enough models of actual people about her for imitation. All these activities, while conscious within a limited sphere, are "forgotten," that is, crowded further back under the veil of the subconscious, as the child grows older and confronts new problems of adjustment, problems which are real rather than "make believe." But they remain planted in the nervous system to be called forth again into practice when some cue in the form of a similar experience in connection with an actual child pricks the dormant complexes of the associative memory.

There are those who deplore bitterly the passage of this

phase of experience out of the lives of children, maintaining that it diminishes the interests of adult women of the future generations in motherhood.[1] There are of course losses and gains to be reckoned in this connection. There is a certain loss of sentiment for the child and there is also a lack of technical ease of manipulation when the newborn child appears. Of the two the former loss is the more serious, since practice play with dolls predisposes toward the child and makes it appear to be desirable. On the other hand much of the traditional care of infants which comes down from mother to child through such channels as these might better be forgotten, provided more scientific instruction is ready at hand. Traditional methods of child care are of course also handed down in a more conscious way from experienced to inexperienced mothers. Until recently practically the whole content of the maternal "instinct" was of this mixture of traditional and inherited methods. With the development of sciences pertaining to infant care and hygiene and nutrition generally, a highly conscious learning process and a wholly obvious learned or acquired content have been introduced into this fundamental "instinct" through the propagation of scientific methods and information. Those who now maintain (what was at one time a most common contention) that the mother's instincts or her inborn knowledge of the child's needs is the best guarantee of its welfare are regarded as hopelessly antiquated in their thinking. No person even casually acquainted with the distribution of infant mortality rates in relation to scientific training for baby care would make such an argument to-day.

The sociologists and others interested in the child and the family still continue to speak of "the maternal instinct." Probably what they mean by this usage is not very clear to

[1] See W. C. D. Whetham, *The Family and the Nation;* also Whetham, *Heredity and Society*, ch. 8.

themselves. Many writers on social questions have not taken the trouble to make a definition of instinct as a check upon their use of the term. Others who have accepted some one of the current definitions have not tested their usage by means of their definition or have not tested their definition with a reference to the facts. In the former of these respects, at least, they are like those biologists described in a previous chapter who have memorized the Mendelian principles of heredity and who set them forth neatly in their books, but do not make use of them in their thinking and writing. It is therefore largely on the basis of customary usage, which has not been corrected by critical analysis, that the sociologist and the publicist continue to speak of the "maternal instinct" as if they believed that the care of the infant is an instinctive activity. Others, still, do not realize that an instinct is a structural fact and speak of an instinct as an attitude or a quality, remaining comfortably ignorant that they are under any obligation to prove the inheritability of the thing they have called an instinct. The various constituent processes of infant care need but be analyzed, much as criminality was analyzed in the preceding chapter, to show that it is not a unit character or even a unit activity and cannot be inherited as such; that it is an abstract synthesis of activities evaluated and organized by the social environment (in so far as it has been organized into one single activity process at all[1]) rather than by biological heredity; and finally that it is composed of unit activities, some of which are of very recent origin and could not have been selected into the inheritance of the racial type and broadcasted by any conceivable process whatever.

This will be admitted by most sociologists upon reflection. They will even contend that they do not understand by an in-

[1] Obviously the whole of the activity and attitudinal content of such a complex as child-care never appears together at one time in one unified activity process. The total synthesis is, consequently, abstract rather than concrete; is valuational rather than of an activity nature.

stinct that all of the component activities are inherited, but that only the directive or determinative elements in the activity complex or series have been inherited.[1] They rightly contend that if we hold that all of the activity must be inherited to constitute it an instinct we can have no complex social instincts at all, since there is no socially constituted activity which does not contain acquired elements. Therefore, they maintain that the maternal activity complex is an instinct because its central directive force is inborn or inherited, even though most of the acts performed for the child by the mother are learned acts. Let us examine these contentions in some detail.

It may be repeated that there is no definite, stable unit activity which we may speak of as maternal care or infant care or "maternal instinct." There are as many varieties as there are mothers and as many general groupings of varieties as

[1] See W. McDougall, *Introduction to Social Psychology*, chs. 7 and 8; W. E. Hocking, *Human Nature and Its Remaking*, ch. 10 ff. For a different view, involving the implication of an external and conceptual direction of the instinct, as opposed to the structural inheritance view, see T. B. Veblen, *The Instinct of Workmanship*, pp. 3 ff. Veblen does about all the violence that is possible to the facts of neurology and the Mendelian theory in his definition of instinct when he says, "Instinctive action is teleological, consciously so, and the teleological scope and aim of each instinctive propensity differs characteristically from all the rest. The several instincts are teleological categories, and are, in colloquial usage, distinguished and classed on the ground of their teleological content. As the term is here used, therefore, and indeed as it is currently understood, the instincts are to be defined or described neither in mechanical terms of those anatomical or physiological aptitudes that causally underlie them or that come into action in the functioning of any given instinct, nor in terms of the movements of orientation or taxis involved in the functioning of each. The distinctive feature by the mark of which any given instinct is identified is to be found in the particular character of the purpose to which it drives." *Loc. cit.*, 3–4. This view of instinct, it will be recognized, conflicts with the argument of this book as a whole. Such a definition of instinct as the one here cited from Veblen cannot be taken seriously. It is cited merely as an extreme instance of the viewpoint of those who find the limitations of the Mendelian theory of inheritance irksome when they discuss the native or inherited elements in human nature.

there are schools and class and national customs of infant care. But, for the sake of argument at least, we may assume that any one woman's methods of infant care at any particular time constitute *her* "maternal instinct." Does, therefore, the second contention hold, that the inborn element in this activity series, which characterizes this particular woman's methods of infant care, directs the whole complex? Among females of the animals other than human it very probably does: but it is doubtful if such can be claimed even for savage mothers of the human type. As remarked above, it is difficult to separate early acquirements through the imitation process from biological inheritance without considerable intensive investigation. But it is doubtful if more than the response to touch, temperature and odor stimuli from the child by fondling, holding and licking or kissing, a more or less vague unorganized emotional response to its cries, which chiefly manifests itself in movement toward the child, vague answering cries and the discharge of milk upon certain definite stimuli of pressure upon the breast, can be said to be inherited by the human mother.[1] This is all that the animal mother also inherits. But such an instinctive equipment is sufficient for the care of the animal young, because it is born with sufficient development of structure and function to enable it to respond to and take advantage of such instinctive aids.

The human infant is born with such incomplete development, due to its prolongation of the period of infancy far beyond the point of birth, that it could not exist without a greater degree of responsiveness from the mother than her animal instincts provide for. Consequently a new technique of infant care must be developed or acquired by her, through the use of her intelligence, which will enable her offspring to survive. Very probably the prolonged period of infancy in

[1] For lists of the supposed instinctive or reflex content of the "maternal instinct" see Chap. XVI.

the child has been selected into the race because of the greater adaptive intelligence of the human mother. Rather it would be more nearly correct to say that a prolonged period of infancy, involving the birth of the child prematurely from the standpoint of lower animal life, and immediate survival efficiency, has been selected into the race because of the ultimate survival value of a longer learning period or a more varied capacity to make adjustments (greater flexibility of characters) which permits the acquisition of a vastly greater store of adjustment technique. On the other hand, the mother's greater intelligence, supplanting the fixity of instinct and thereby offering a substitute for the child's instincts upon which he would otherwise be more dependent, has served as the necessary condition, making this prolonged infancy possible. The mother meets the greater demands of the less capable infant by building up a substitute and acquired adjustment technique in herself. Most of this technique serves also in other capacities, as well as in the care of the infant. Her vague emotional responses become organized into definite cuddling and fondling activities. The inarticulate but quieting or exciting cries of the animal mother are through human intelligence expanded into language and song which not only soothe or excite the human child but which later on serve to guide and instruct it. Her hands not only replace the tongue of the animal in rendering minor services on an instinctive basis,[1] but she learns to render the most complex services

[1] The hygienic services of the tongue of the lower animal may very well be rendered on an instinctive basis, for both the sensations of smell and taste are able to make a very close correlation with its activities. But there is no reason to suppose that the tactual and temperature sensations connected with the hands of the mother are instinctively correlated with hand movements in such a way as to cause the mother to render even the elementary manual services connected with sanitation, feeding and the like. Such an instinctive tactual-temperature correlation might possibly be found in connection with caressing and cuddling. It might be worth while to suggest, as Ellis says (*Studies in the Psychology of Sex*) that certain abnormal sexual practices performed by means of tongue or mouth and known to the pathologists may have an instinctive

through this medium. But these services were rendered in other connections long before they were tendered to the child and they do not appear for the first time in connection with child care. In this instance intelligence quite manifestly replaces instinct.

To what extent the mother's intelligence has been developed as a means of responding to the growth of the period of human infancy is an unsettled question, but it would seem that such adaptive response would be a rather indirect method of securing flexibility of character in the infant. It presupposes flexibility in the mother as a means to its development in the infant. In fact the factors producing greater intelligence in the mother are the same as those demanding it in the child—the growing complexity of an environment which is constantly re-formed through the pressures of changes in the density of population and an advance in the technical arts. The great complexity of acquired technique which the highly intelligent and civilized mother has developed to supplement instinct in the care of infants born immature is rather an offshoot from this general fund of intelligence or acquired mental technique than the cause of it. Infant care is a derivative or composite science and art. Its usefulness has been amply demonstrated by the lowering of the infantile death rate, because of its aid, to a mere fraction of what it remains where no science, but only instinct and tradition, are employed in the art.

Because, therefore, of the need of greater flexibility of response in the child to an increasingly complex and more rapidly changing environment, mother care of the infant has gradually been substituted for instinctive self-direction by the young infant in the early adjustment process. The child is born before its organic and basic neural structures are com-

---

odor-taste correlation going back to the earlier animal use of the tongue for tactual and communication purposes in the period before hands had fully evolved, though this too may be doubtful.

pleted, with the result that these may be organized very largely under the pressures or controls of the external environment—in man, mainly under the direction of the psycho-social environment. Thus the substitution of mother care of the child for instinctive self-direction by the child has gradually broken up and selected out of the heredity some of the old instinctive processes which enabled the offspring to be functionally active at birth. Some of these instincts are merely pushed further along in the postnatal developmental process and are called delayed instincts. Others still apparently are disrupted or disorganized and tend to disappear or to become vestigial. That is, they break down into constituent reflexes, which are later organized under the influence of maternal care or other environmental pressures into habit complexes more flexible and much more adaptable to the survival or variable adjustment needs of the growing organism. In this way the heredity of the child is being selected in conformity with the new environmental fact of mother care. This is especially true of human types, but it is also apparently to some extent true also of the higher and more domesticated animals. In the case of domesticated animals, human care often takes the place of intelligent mother care.

We are now ready to turn to the question as to whether the series of acts of child-care, which at any particular time may conceivably be spoken of as a woman's "maternal instinct," is really directed or dominated by the instinctive elements in the whole complex of child-care acts. Obviously this is the only serious claim the instinctivists can advance to maintain the rightfulness of their contention that the complex of child-care acts constitutes an instinct. The activity elements of the child-care complex which are probably true instincts are mentioned above.[1] To what extent do they control the other acts

[1] See also Chap. XVI for a longer, but imperfectly authenticated, list.

of the mother which are directed to the real or intended service of the child? It is not conceivable that the instinct or reflex to discharge milk upon characteristic stimulation could function in any other way than as it does. The instincts to respond by voice and by motion to the cry of the child are capable of expansion to a wider application than that which they have among lower animals or savage women. The same appears to be true of the affective response or responses which the mother gives to the child and which apparently are derived from her sensory contacts with the child, especially the temperature, tactual, olfactory and auditory ones. Let us consider each of these separately.

The vocal responses to the child's cries—the responses of the mother as well as the cries of the child which are instinctive—apparently have in their native form merely the power to produce useful movement or silence or vocal action in the offspring or to frighten off the enemies of the child. Silence produced by soothing monotony in the mother's voice or by the shock from the shrillness of her cries may have survival value for the child. The young of some animals scurry hastily to cover upon hearing the mother give a certain signal, which is evidently effective because of its emotional significance. Other signals call the young to partake of food. Certain signals from the young start the mother into a rage if she beholds the threatening intruder or into a condition of great excitement if she does not locate the danger and thus have an opportunity for the organization of her activity or emotional expression about a definite object. Other signals between adults have sex significance which apparently produces a response instinctively.

All of these responses are in the main or wholly instinctive. No doubt, however, the mother does learn methods of expressing her rage more effectively and the young learn to seek cover to advantage or to cause their instinctive appeals for

food or aid to take on a more effective emotional content. Some animals, such as the dog, can be observed to teach their young to play and to go through sham fighting movements, which are identical with the real acts of fighting except in the matter of intensity. Also the instinctive emotional response is organized about its object and largely characterized by that object, as suggested above, and varies as the object varies. Diffused excitement and nervousness are transformed into concentrated rage by a normal process of emotional synthesis when the intruder is finally discovered or perhaps the whole response merges into fear and flight. Furthermore the attack upon the intruder, or the flight from his presence, varies in its method according to what sort of object it is. Thus it is apparent that such responses have a learned element in them even this far down in the scale—unless indeed we assume an infinitude of similar instincts to correspond to every object of attack and under every conceivable condition. In that case, for instance, we should have the instinct of the hen to fight a snake attacking her young, the instinct to fight a dog attacking her nest, the instinct to fight a human being (young, old, male, female, timorous and brave) interfering with her young, and the like, ad infinitum. She acts differently in each case and therefore if her actions are true instincts she must have as many instincts as she has actions or action patterns.[1] We

[1] We actually do find such an attempted classification of the fears. Thorndike (*Original Nature of Man*, 64) speaks of "specialized instinctive fears," and Ross (*Foundations of Sociology*, 161) of "instinctive fear reactions." I have been able to collect the following list of specialized fear reactions (supposed by the writers cited to be instinctive) from the literature as indicated:

"Instinctive fear of being alone in the dark" (Thorndike, *op. cit.*, 62).

"Instinctive fear of caves" (W. B. Pillsbury, *Fundamentals of Psychology*, 428).

"Instinctive fear of the crowd" (Graham Wallas, *The Great Society*, 57).

"Instinctive fear of closed places" (Pillsbury, *op. cit.*, 428).

"Instinctive fear of coming into contact . . . with practical life" (Hugo Münsterberg, *Psychology and Industrial Efficiency*, 6).

"Instinctive fear of the dark" (S. S. Colvin, *The Learning Process*, 55; E. A. Kirkpatrick, *Fundamentals of Child Study*, 101; Pillsbury, *op. cit.*, 428).

can escape the difficulty here only by finding the instinctive element further back than the complete and complex activity which appears on the surface.

Wherever we place the instinct, at the point where we observe the completed action or back in some of its constituent elements, the real question is, does the instinct determine the more complex activity built upon it? Does the cry of the

"Instinctive fear of the dead" (Pillsbury, *op. cit.*, 428).
"Instinctive fear of death" (Blackmar and Gillin, *Outlines of Sociology*, 251).
"Instinctive fear of any particular enemy" (Darwin, *Origin of Species*, ch. 8).
"Instinctive fear of open places" (Pillsbury, *op. cit.*, 428).
"Instinctive fear of precipitous heights" (Wallas, *op. cit.*, 57).
"Instinctive fear of reptiles" (*Ibid.*, 52).
"Instinctive fear of the sea" (*Ibid.*, 57).
"Special (instinctive) fear of snakes" (Wallas, 68).
"Instinctive fear of strange places" (Pillsbury, *op. cit.*, 428).
"Instinctive and disinterested fear . . . in behalf of young" (A. Shand, *Foundations of Character*, 205).

It will be observed that most of these fears are too general to be inherited unitary structural processes. They are often composites of many potential types of reactions. Thus there would be as many structural types of fears of open places as there are types of open places themselves. It is not likely that there is a separate instinctive fear reaction for each kind of open place, nor is it any more probable that there is a general instinctive fear reaction for all open places taken together. The instinctive fear reactions which function in connection with the perception of open places are doubtless much more simple than any open-place situation and quite different from it in detail. Also they are probably used in a great many other and different types of fear situations. What these native fear reactions are which function in concrete localizable situations has never been adequately studied, but in the case of open spaces, if the fear reaction is really instinctive, it may have some relation to the fact that moving objects are exaggerated in the periphery of the field of vision, and sometimes to the fact that large or deep unbroken open spaces lower than the level of our feet frequently tend to make us dizzy and alarmed, because we lose our sense of equilibrium due to not having learned to localize perspective and measure distance downward. Of course there are many acquired elements in the fears of open spaces, such as any previous experience with or observation of or reading about wild or ferocious animals in open spaces, such as an arena, or with a storm coming up while we were in an open field, etc. These acquired correlations between fear and open spaces are doubtless much more numerous than the instinctive ones, even though we are not conscious of their origins. Neither the acquired nor the instinctive elements pertain uniformly to everyone, but are present or absent in different individuals in accordance with a variety of circumstances.

young call forth instinctively more than the answering cry and forward motion [1] which is instinctive in the mother? Do her instincts to respond in these definite ways cause the development of language as we now know it, which gets expression in lectures and books and bulletins on child welfare, infant feeding and child labor and in the congressional enactment (nominally at least made by the male members of the species) establishing the Children's Bureau? Have the primitive instinctive forward movement and fondling caresses of the mother in response to the cry of the child expanded into activities under the direct control of the instinct, resulting in the construction of homes for orphan children and in making diphtheria antitoxin? This seems unlikely. It is not easy to see how these definite instincts would be able to go over into these admittedly cultural activities without being directed from the object end or environmental control aspect of the process. There is nothing in forward movement which would of itself end in the manufacture of diphtheria antitoxin and there is no germ of a children's code (except in the imagination of the instinctivist) in the savage warning cry of the mother. A high degree of scientific and social organization, built more out of

[1] Walking in human beings has to be learned, for the human young do not walk without practice. Is this a case of delayed inheritance, the completed act being conditional upon earlier structural development, or is it a case of vestigial instinct, the mechanism having been bred out of the human type through hereditary selection in response to the artificial fact of mother care, the mother taking the place of the instincts in the child, with the result that the habit of walking has later to be reconstructed from the disorganized reflex elements of the disintegrated instinct under the influence of environmental demands or pressures? The former is possibly more nearly the correct interpretation, since walking frequently appears to come too suddenly into the organized activity of the child for it to be a learned or reconstructed activity. It seems as if in some cases at least it were conditioned upon certain neural connections being suddenly completed as preconditioned in the inheritance. (See R. S. Woodworth, *Psychology*, 95–7.) However, there may also be a truly acquired and non-hereditary element in locomotion among human beings, especially since they have changed their posture in locomotion in the process of their evolution, and since most children apparently do not make the walking adjustments suddenly, but learn the art slowly and with great difficulty.

things and for ends *not* directly connected with child welfare, is much more obviously responsible for these developments than these primitive instinctive responses to the presence of the child.

But may we not say that the mother's affective attitude toward the child, her tender emotion,[1] so-called, is the true maternal instinct and that it is after all the efficient cause of the development of the subsequently learned activities? [1] We cannot answer this question without raising another, namely, as to how an affective attitude could become the cause of intelligent and constructive action. Evidently it could do so only under two conditions. Either the affective attitude must represent a desire for these more complex learned activities, or it must constitute a condition or attitude which can be satisfied only by the development of these activities. Very probably these two conditions are identical, for the attitude apparently can be defined only when stated in terms of a desire. But supposing the attitude can be considered as a thing in itself, we know that affective attitudes are frequently more fully satisfied by instinctive expression than by externally imposed activities. Activities from the outside, which involve an adjustment in any way different from the habitual or the instinctive always cause nervousness and confusion and unpleasantness in some degree or other. As long as the instinctive, that is, the inherited structural technique or neural organization and the acquired or habitual overt responses can be performed, the animal is satisfied. We have an abundance of examples of the difficulty encountered in inducing a diseased ignorant mother to wean her child from the breast when its life may depend upon her taking the step. It is also difficult to teach ignorant mothers not to

[1] This view would appear to be justified by McDougall's treatment of instinct and emotion. See his *Introduction to Social Psychology*, ch. 3.

rock their children to sleep, not to jounce them, and not to respond to the petulant or hunger cries of the baby with complex foods suitable only for adults, or even harmful to the adults themselves. It is also a wise mother who can learn not to respond to all cries of the child when her reason (as opposed to her instincts) tells her that the child will be better off if subjected to silence or apparent neglect. The conditions of rearing the child having changed, many of the old instinctive signals become false signs or are even provocative of harmful results, if freely responded to; but the mother has to learn this fact and repress her instinctive responses at the cost of some emotional unpleasantness to herself. Thus we find that instead of the modern care of the child being a necessary or natural condition to the satisfaction of the mother's instinctively affective attitude toward the child, it is in reality in strong opposition to it. Thus, through education and the gradual acquisition of habits adjusted to the modern conditions and needs of child care, a new set of affective attitudes is developed toward the child which are often in conflict with the old instinctive ones. These new and conflicting affective attitudes are rendered possible because it is feasible to build up a feeling response or affective attitude on the basis of acquired habits quite as well as on that of instinct with which it is hereditarily correlated.[1] The new habitually conditioned affective attitude, if scientifically directed, is more forward-looking and serviceable to the child than the instinctive one can be under modern complex conditions.

But this attitude, this "tender" emotion, so called, is not instinctive or inherited. It is an acquired emotional attitude. We need not here raise the question as to whether any effective attitude can be the cause of activity, although it may be

[1] See L. L. Bernard, *The Transition to an Objective Standard of Social Control*, ch. 2.

said that the prevailing judgment is to the contrary. The affective or feeling and emotional aspect appears to be the correlate or accompaniment rather than the cause of the act, a sort of crude signal to the organism of the effectiveness of the adjustment which is being made. But if we assume (contrary to the better judgment of the psychologists) a causal relationship between emotion and action by means of which the "tender" emotion becomes the source of the acts of child-care, we are confronted still by the fact that the emotion is in this case primarily acquired. Nor is it self-generated from the instinctive "core" of the tender emotion which, according to McDougall, is primary and instinctive. The acquired emotional complex arises only out of experience, it is somatic rather than of hereditary origin. The experience, gained in the process of active adjustment to environing conditions, determines the actual content and reference, and in the main the intensity, of the emotional complex which is associated with child-care. Consequently, if, as some of the social psychologists and educationists claim, the emotional complex is the cause of the correlated acts, those acts could be shown to proceed from a learned or acquired adjustment affective complex rather than from a purely primary and unitary instinctive tender feeling.

If we examine the other assumption that the affective attitude represents a general or a specific desire for the welfare of the child and therefore leads to the development of each and every technique for securing it, scientific as well as non-scientific, we must ask, What is the content of this desire for welfare? It will be either a desire for some concrete things, which in the mind of the one who desires symbolizes the child's welfare as a whole, or it will be a desire for an abstraction which necessarily reduces to the status of a word symbol, if it is detached from the concrete contents from which it is logically synthesized. Consequently we must conceive of

the primitive human or animal mother as desiring either the general word symbol, or the synthetic and socially approved welfare content as applied to her child, or certain specific acts, which, we must assume, she foresees. For desires cannot exist apart from neural structures which stand for definite and concrete things; they are in fact the "feeling" or perception (however dimly or definitely outlined this perception may be) of the absence of these very things. It is absurd to think of the primitive mother possessing an instinctive abstract conception of child welfare to serve as a basis for the future development of her child-caring activities, for such abstraction must always be the result of a synthesis of concrete experiences which antedate the abstract concept which itself originates by synthesis from them. It is equally unthinkable that she should instinctively foresee in definite (or indefinite) imagery the specific modern-day learned acts which would conduce to child welfare, since she could not possibly have inherited neural structures as a basis for such perceptions.

The question may even be raised properly as to whether the mother's affective attitude toward the child, at least in anything like the completeness of detail in which we know it to exist in the mature and experienced individual, is itself inherited. There seems to be good reason to suppose that it grows out of the experience of the mother in her various instinctive and acquired contacts with the child, prenatal and postnatal, as a part of the self which develops through experience-getting contacts.[1] It also grows in part out of the tradition of love and reverence for the child which ever increases with civilization and is communicated to each succeeding mother with increased power and in ever greater

[1] See A. J. Todd, *Theories of Social Progress*, chs. 4 and 5; also C. H. Cooley, *Human Nature and the Social Order*, and *Social Organization*, for general statements of the social psychology of this sort of learning process.

detail, reinforced by the suggestion of art and literature, morals and convention, religion and science. However, the discussion of this aspect of the subject perhaps more properly belongs to a detailed treatment of the subject of environment.

We have now, by means of this somewhat lengthy analysis, established the fact that the part of the series of child-caring acts which are inherited do not dominate or determine the development of the learned elements in the activity series. In fact, the inherited content is so elementary and so inadequate that we scarcely regard it as child-caring in content at all. The learned acts are introduced and the whole complex is organized on the basis of new and socially constructed ideals which frequently conflict with the instinctive elements which are dominant in the earlier stages of animal development. In this maternal or child-caring type of activity complex, as in earlier ones considered, we find that it is the social valuation for social ends which increasingly, consciously or unconsciously, organizes the activity complex and gives it its name.[1] This valuation process may, as was earlier said, organize quite diverse types of activities, structurally considered, and—what is more to the point from the standpoint of our argument—the instinctive elements so organized into a socially directed activity complex may be of quite distinct genetic derivation, having no discernible historical connection with the instinctive elements employed in the original processes of child-care. They may first have arisen in connection with some other survival process which organized them into other activity complexes for other adjustment ends. Likewise the acquired elements thus organized into a superior whole may have—often have—been developed in quite differ-

[1] It may also sometimes be an expanded individual valuation for individual ends which dominates and directs, but the general tendency of evolution is for the socially determined value complex to dominate and denominate the individual's activity and his conception of ends.

ent connections and were carried over to this complex by a process of borrowing or assimilation. The dominance is, therefore, to be viewed from the object or social result end rather than from the biological inheritance or instinctive end. A recognition of this fact destroys the last plausible argument for speaking of the "maternal instinct" as inclusive of the whole process of child-care. We should rather call it the maternal activity or child-caring complex, though we must not forget that it is infinitely variable as it operates among different peoples or in different persons and situations. Therefore, to speak at all of it as a unit complex is manifestly misleading. It is primarily an abstract or synthetic value complex, socially determined and organized, with many shifting constituent activity complexes. It of course contains inherited elements, but these do not render the whole complex an instinct. The essential fact is that its organization is now dominated from the standpoint of social ideals or values, and this constitutes it a social value complex, or at least a group of acquired activity complexes.

If the reasoning here set forth regarding the "maternal instinct" be accepted, it will be even more readily apparent that we are not justified in speaking of a paternal instinct. Obviously the father has not those inherited organic connections with the child which the mother possesses. His connection with the child is a learned one. Apparently only recently has he become familiar with the fact of paternity;[1] and he has been induced to become interested in his offspring in comparatively recent times through the growth of humanitarian sentiment and tradition in society at large which has built up a cult about the child and has gradually drawn the male parent also into its circle to worship at its altar. Concrete association with the child, arising as a result of the institution of the patriarchal family which gave a distinct eco-

[1] See Westermarck, *History of Human Marriage*, and similar works.

nomic value to the child for the household of the male, has been even a stronger factor in giving him an affective and child-caring attitude toward his offspring. Originally under the maternal organization of the family he did not always recognize the fact of either biological or social responsibility for the child. Often he did not know the children which he had begotten. But with the change of family structure and of the system of tracing relationship, due to the changes in the life economy of society which brought about the paternal system, he has become the chief economic protector of the child and gives it his own name. Propinquity breeds affection and responsibility calls for the technique of fulfillment. Thus the father or paternal "instinct" is in reality quite clearly a habit complex or acquired value concept.

Some writers [1] also speak of a parental instinct. It is difficult to conceive what the structure of such an "instinct" could be apart from the structure of the two "instincts" already discussed. The parental attitudes analyze into those we call paternal and maternal. Consequently it cannot be a separate "instinct," and by the same token it can be no instinct at all. This term merely affords another example of the general uncritical tendency to speak of any activity socially evaluated and abstractly synthesized as an instinct. Parental activity complexes when standardized are social products in response to social evaluations or social situations.

[1] Among these are: E. S. Bogardus, *Essentials of Social Psychology*, 14, 56, 58, 59; *Introduction to Sociology* (1917), 27, 46; C. A. Ellwood, *Sociology in Its Psychological Aspects*, 213, 214; E. C. Hayes, *Introduction to the Study of Sociology*, 214; B. Kidd, *Social Evolution*, 315; E. A. Kirkpatrick, *Fundamentals of Child Study*, 46, 54, 55, 63, 109–114, 187, 191, 192, 207, 211; W. McDougall, *op. cit.*, 66, 67, 69, 73, 75, 82, 126, 132, 144, 202, 266, 268–273, 275, 276; M. Parmelee, *Criminology*, 143; W. B. Pillsbury, *Fundamentals of Psychology*, 425; E. A. Ross, *Principles of Sociology*, 46, 52, 549; A. Shand, *Foundations of Character*, 38–40, 46, 183, 237, 239; E. L. Thorndike, *The Original Nature of Man*, 15, 117, 119, etc.; G. Wallas, *The Great Society*, 39, 43, 140. These titles may be considered as representative of thousands of others making similar employment of the term. The reader can examine the contexts to discover for himself their method.

CHAPTER XV

SOME FALSE INSTINCTS EXPOSED—PLAY, FIGHTING, CONSTRUCTION, ETC.

In the last two chapters those reputed instincts which have the largest organic content have been analyzed with a view to discovering the extent to which they contain instinctive elements and the extent to which they are acquired. These activity and value complexes were selected because the method of analysis which would give a successful refutation of their claims to instinctive character would obviously be applicable to other activity complexes with admittedly less instinctive content and thus obviate a good deal of repetitious analysis and reasoning. We may now consider in less detail some of these other "instincts." Three of these activity complexes or series which may well be grouped together are pugnacity, play and construction. Each of these complexes is widely, although not equally widely, accepted as an instinct and all three have been used extensively as illustrations of instincts by writers in social psychology.[1] We may consider these three supposed instincts from a somewhat different angle from that from which the preceding examples were viewed. In Chapter XII the matter of the mixture of inherited and acquired traits in the same activity complex was under consideration. In Chapter XIII we considered false instincts from the standpoint of their violation of the unity of inheritance. In Chapter XIV the problem of the dominance of the activity was to the fore and we were forced to conclude that the social situation

[1] See, for illustration, summary of list of instincts in Chap. IX.

rather than the inherited elements determined the name and character of the organization and the end of the activity series. In the present and the following chapters we shall be mainly concerned with the interchangeableness of activities which enter into the supposed instincts. The three complexes above mentioned have been selected to afford illustration of this fact of interchangeability.

The three conditions mentioned in the preceding chapters as being incompatible with a true instinct can easily be shown to exist in connection with fighting, play and construction. Each of these terms, as used by the writers who classify them as instincts, is an abstraction. There are as many ways of fighting as there are instruments of combat and objects to be fought. There are even more ways, for the resulting number of methods would more nearly approximate the product of a multiplication than of an addition of these two terms. The same is true of play and of construction. There is no one general, all-inclusive act which we can call play. But there are separate play acts which we may call tennis, chess or hide-and-seek. Even these acts are in themselves vastly complex and involve much variation in their execution under varying conditions. Consider, for example, the complexity of an instinct to play tennis or to play chess. It is said that the number of possible moves in the game of chess is practically infinite. Each of these moves must therefore involve a different hand and eye coördination, to say nothing of numerous other accessory coördinations connected with the perception of how one's opponent is moving or has moved, the present state of the game and the like. When in the history of the human race did man acquire this general instinct of chess playing with all its multifold structural coordinations? Another complicating factor in this connection also is that these coördinations are made, not automatically as befits a true instinct, but on the basis of careful reasoning

or upon the basis of habit which is obviously the result of previous rational processes. Very few chess players have the "instinct" complete, that is, know how to make all the possible moves. Also every one seems to learn how to make the moves which he does make, although of course, it might be contended that this fact merely indicates delayed inheritance rather than the dominance of the environmental pressures. If such is the correct explanation, we must conclude that this "instinct" manifests a remarkable variability as to the degree of delay in different individuals and in a large portion of mankind it does not appear at all. Perhaps the same combination of time of appearance and of number of moves never occurs twice in the human race. Such a peculiar instinct would indeed be phenomenal. We must therefore conclude that rational elements are mixed in with the instinctive. Also it seems clear that the development of any form of this activity complex known as chess playing is dominated by external or environmental pressures, for we have no records of people learning to play the game without guidance from others or from books. Possibly, however, it might be contended that only the inventor of the game had the true "instinct of chess playing." But, on the other hand, we know that the game is the result of an evolution rather than the product of the mind or inheritance of a single inventor. In many of us it is wanting altogether.

Many instinctivists will be impatient with us for what they would term so flippant an analysis as the one given above. They may contend that they have not spoken of an instinct of chess playing, but of an instinct to play. In that case we shall be compelled to repeat our former statement that play represents no concrete describable and definable unitary or structural fact, unless it connotes a concrete method of playing. Play is a word, an abstraction, even more of an abstraction than chess playing itself. It is a synthetic concept, a

word image, symbolizing all or more than one of the concrete ways of playing. The word play, when signifying an instinct, either represents structually all the ways of playing or it represents less than all. If it represents less than all, it should be described in terms of those activities and structures which it does represent and not in terms of the general word play.

It is of course likely that those who speak of play or fighting or construction (workmanship) as instincts would want to limit the activity which they think of as inborn or inherited to some concrete act or set of movements which are more or less common to all the acts which are described under the general abstractions play, fighting or construction. In this way the instinctivist might appear to justify his objection to the inclusion of chess playing as a part of the instinct of play. He would substitute the "core" of the activity complex for the complex itself and name the whole complex after the "core." We have already shown that this is not justifiable unless, possibly, it can be shown that there is a "core" and that this "core" dominates the whole of the complex in its formation or organization and in its execution. That there is no such specific domination, even in the activity complexes which have a high organic inheritance content, has already been shown. If there were such domination, however, it is not conceivable that we should have such essentially different play activities as chess and singing, or as ninepins and verse-making, resulting from this dominating "core." Furthermore, it is not conceivable that any specific "core" common to such diverse activities or complexes can be found. In the highly socialized activity complexes here under consideration still less could there be such dominance. Where environment so greatly differentiates the resulting expressions of the mythical "core" impulse is it not better to speak of environment as the dominating factor?

There are, however, certain common activity elements or none-specific "cores" in these various activity complexes which we generalize under the terms play, fighting and construction. What are these common elements? If we take such diverse types of play as tennis, chess, hide-and-seek, puzzle-working and tuba-playing; of fighting, as fist-fighting, gun-fighting, bomb-throwing; of construction, as designing an evening gown, building a battleship or making dry-goods boxes, we may be inclined to think there is not much in common in each class of activities, much less in the whole series of the three activity or value complexes taken together. The common "core" reduces to very small proportions. If we have difficulty in finding it, the trouble is that we have been accustomed to look for things too large and too completely organized in such connections. This attitude of expectancy is a product of our over-emphasis of the pseudo-instinctive or acquired content in these reputed instincts.

The content common to all of these classes of acts seems to consist of some simple eye-movements and possibly wrist manipulations and other body flexions generally called random movements. Even these are developed into definitely coördinated movements through the learning processes of sensory and motor localization. The child has no definite eye or hand correlations by means of which he can control his environment until he learns them. Furthermore, the kinds of correlations which he develops depend wholly upon the environmental pressures, or needs, which operate as the stimuli in this localization-adjustment process. This would seem to constitute ample proof that the complex specific correlations are not instances of delayed inheritance; also that the common elements or "cores" in these activity complexes are not dominant, but merely tributary to the outside demands and organization.

The human organism is inherently, if not specifically and

definitely, active. The constant metabolism going on in the cells causes the infant to be almost constantly in action through all parts of its external organs during its waking hours. Its extremities, especially its arms and legs and hands and feet, are moving almost ceaselessly and it also exercises its other organs. Only later in life does the activity of the human organism slow down, this slowing-up process becoming more and more marked as old age and death approach. This spontaneous activity takes place under two different types or forms of tendencies; differentiated or specialized and undifferentiated or general or random movements. In most cases the normal differentiated or specialized movements of the child at birth may be regarded as instincts or reflexes, for the number of habits acquired before birth is probably not very great and such organic habits as are formed before birth certainly are not usually complex. Some of these specialized or inherited activities manifest at birth are quite complex. This is especially true of the vegetative functionings, such as breathing, circulation, digestion, assimilation and excretion. Nursing and swallowing are only less complex and less definitely formed at birth. Others, such as crying, are relatively simple. Most are very simple indeed. These are the very numerous simple reflexes in response to tactual and temperature sensations, to light and sound, such as winking, opening the eyes upon hearing a sound and the like.

The undifferentiated or random movements may also be described as instinctive or inherited. They are responses for the most part to internal stimuli or to internal stimuli acting in concert with external stimuli. They take place on the basis of definite structural equipment, but they lack definite or meaningful external correlations. Also they probably lack definite central neural control organizations, these being formed only when these random movements are organized into habits under the pressure of the environment. That is

why we say they are organic responses to internal or external stimuli and call them random movements. They have often been accounted for as the result of surplus energy, and this explanation is true in the sense that they are made possible by the internal explosion of energy which is not yet applied to meaningful or socially useful external correlations or adjustment adaptations. But the energy is not surplus in the sense that it is not useful or cannot be used. Without this energy, thus expended, the child could not develop its future adjustments on a learned basis; it could not survive. It is the chief basis of all the specialized neuro-muscular adjustment technique which the child acquires in after life. It is one of the two forms of raw materials of action out of which he organizes his habits. The other supply of raw materials for action consists of the instincts and reflexes, as well as the habits previously formed. In the child's earliest activities, this random expenditure of energy is guided only by the inherited structures of the infant body, such as its joints, muscular, organic and other tissue correlations. Even these structures can be modified to some extent, for bones can be reshaped and tissues be developed or atrophied within certain limits. The guidance of the expenditure of this energy, other than that consequent upon the fact of confinement to the limitations of the inherent structures mentioned above, comes from the outside, and it operates both through direct impact of the external physical and chemical environments and indirectly through the neural and other physiological structures of the organism as influenced by external conditions.

Society is made up of psycho-social environmental pressures which function as stimuli to take hold of and guide this spontaneous tendency of muscle and neuron to be active. The motive force comes from within and bears a large conditioning relationship to food and consequent metabolism, and to

the chemical composition of neurons, secretions, etc., as may be apprehended from the most casual observation. The molding process, however, comes primarily from without. Natural environment itself offered to primitive man some guidance of the sort that this external organization affords. The modern psycho-social environment, with its institutions and its cultures, acting alone or in reaction upon the natural environment, offers infinitely more guidance. Indeed the civilized man is the product primarily of his civilized or cultural environmental pressures, which organize his random movements into correlated or meaningful and socially directed actions. Where these civilized environmental pressures drop out man reverts to savagery and to animalism, that is, he comes again primarily under the dominance of his instincts instead of under the direction of his artificial or cultural and socialized environment. It may even be shown that man could not survive to maturity if all of these artificial or cultural formative controls dropped out, so greatly has even his heredity been modified through the selection of traits which fit him for survival in an artificial or socialized environment, by adjusting his organic structure and organization to cultural instead of to instinctive or purely natural controls. This hypothesis was advanced in the preceding chapter and need not be repeated here in detail.

This process, by means of which the environmental pressures select and guide certain random movements into socially useful or survival correlations, we may call localization. In this way practically all our external technic adjustments are made. These resulting correlations are not inborn, are not instinctive. They would not exist except for the previous occurrence of artificial, that is, externally organized, institutional or non-institutional social pressures which have selected and fixed them to make survival through conformity and efficiency possible. The fact that the tendency to random move-

ment is, broadly speaking, inherited (though necessarily stimulated through metabolism) does not signify that the activity structures built upon this instinctive basis are also inherited. The three activity complexes above referred to—play, fighting and construction—grow up within and from out of this molding process. In fact they constitute the molding process itself, though after they are once developed as practice in correlation they become means to other ends or they become merely ends in themselves (æsthetic activities) and are repeated over and over again merely for the subjective satisfactions they afford. In inception, the play, fighting and construction processes are original or end-object creations. It is only after these acts have been created or constructed in the functioning of the adjustment process, that they become merely means to newer acts of play, construction or fighting, or other ends, or that they are repeated for exercise or are perverted into mere hedonic repetitious wastes of energy and wealth.

Play has been spoken of as practice for life adjustments and such indeed is its primary function, teleologically considered. We ordinarily think of play as less serious activity than most forms of endeavor, which are carried on for personal or social benefit. Play is not, however, directly economic or political or anything else useful in intrinsic or conscious purpose. But it is all of these in its ultimate results. Immediately and organically it is merely the process by means of which a great mass of adjustments or technique, which will be ultimately or immediately useful in the wider adjustments of life, are acquired. Through it the random movements cease to be random and become purposive, but their purposiveness is not usually directly and consciously such. However, not all practice correlation in play is general. In fact, most of it is more or less specific, being carried on as concrete imitative adjustment. Thus the child plays *at* something rather than just

merely plays. Its play consists in part of attempts to imitate activities which it has seen performed, or has heard described, that is, it plays at being a merchant, policeman, school teacher, bandit, etc. It copies a model which serves as the stimulus for its more refined and extended localizations. Play also makes use of original experience-getting activities or adjustments. The child satisfies his curiosity by going beyond the known into the unknown, thus trying out new adjustments or correlations (localizations) and adding them to the total fund of adjustments which it already possesses.

The golden age of play is childhood. It is at this period that most adjustment correlations have to be made. Each movement offers a new experience, and harmonious syntheses of experiences are pleasant. As the child becomes older more of the correlations which it is capable of making—both from the standpoint of its bodily structural limitations and from the standpoint of social structural limitations—are completed and new experiences are not so easily had. Play becomes less nearly constant. Especially is there less spontaneous play in the later years because of the increasing limitations to new experiences. But even more effective than the increasing limitation of experience possibilities with increasing age in the narrowing of play activities is the decreasing supply of random or unorganized energy and movement. As the child grows into the adult his habits become organized, with the result that there is less of free or random activity to be organized anew or to remain in the partially or wholly unorganized condition which makes it available for play. With the organization of the overt expressions of activity goes also the organization of the neural correlates, according to the principles developed in a preceding chapter. Thus increasing maturity makes less easy even mental play or the tentative organization of ideas, a facility which normally outlasts the capacity for physical play. Young children prefer spontaneous play to

organized games, but the older individuals play standard games more and more as age increases and usually they settle down in extreme age to one or two favorites, becoming the slaves of monotonous repetition. This is what we should expect, not only because of the fact of the working up of adjustments which may be imitated from the social environment, but also because of the fact that there is less surplus energy available in old age.

What has been described as happening in games, involving external structural expression, occurs also, therefore, in connection with the internal structures, especially the neural correlations. More and more of the incompleted synapses are made complete through the acquisition of new adjustments. In old age practically all of the neural connections that can be made are completed,[1] and new adjustments, ideational or physical, become exceedingly difficult or impossible. The mind of the child teems with fancies and imaginations; it scarcely knows the difference between the real and the pretended; it falsifies for the mere love of mental exercise. The child asks questions endlessly, its mind playing upon every possible phenomenon coming within the range of its senses or ideational processes. Adults become "sober" in their thinking and the old ordinarily fear new ideas and experiences, because they make greater demands upon them for readjustment than their energies and their moral and ideal adjustment systems will bear. Truth becomes fixed for them along rigid lines, partly because scientific investigation has tended somewhat to fix it there and partly because their habits of thinking have become relatively immutable through the acquisition of prejudices and effective as well as affective alignments. Play is the raw material of life adjustments and it diminishes when sufficient

[1] This does not mean that all the free neural processes are used up. It has been estimated that hundreds of millions of them never are used. But, for one reason or another, they remain dormant and uncompleted. They fail to materialize or function in the adjustment process.

of the raw material has been made into finished products to enable the living process to be carried on effectively. Where games once learned, that is, where the practice once built up out of the random movements or from the neurons with uncompleted synapses, are carried on as ends in themselves, we have an abnormal condition, unless indeed such exercise is a part of the standardized life adjustment processes. Play which is no longer preparation and which consumes energy that should go into the making of necessary social adjustments and which does not create health, or skill correlations that ultimately so serve, is wasteful.

What has been said of play is also very largely true of fighting. However, fighting has two aspects; it is a form of play and it is also a purposive struggle for advantage or defense. Play also frequently casts itself in the form of struggle for advantage or defense in which it is imitative, for the function of normal play is practice. Competitive play and fighting among children (and often among adults) can be distinguished only at the extremes. The two utilize much the same movements and other coördinations, and, to a very large extent, they develop the same localization processes. When competitive play develops violence in connection with anger and aims at the assertion of superiority for external gains of some sort or other, it is ordinarily termed fighting, but the distinction cannot be made with complete clearness. War has always been a sport to the military and noble or leisure classes,[1] and it is not without its recreational features even to those who bear the brunt of it. Where it becomes "earnest" and ceases to be play it still employs the manual and mental and bodily coördi-

[1] See the war poems of Alan Seeger for an expression of the game or play spirit in battle. Many poems and books in the nature of panegyrics of war as the great game in which the human spirit comes into its own were produced, either as forms of self-expression or as propaganda, while the recent great war was in progress.

nations and correlations developed in play. The chief distinction between the two, almost the only one perhaps, must be made in terms of social significance and valuations. It will be recognized of course that play develops a wider range of coördinations and correlations than are utilized in fighting, for play is a preparation for *all* life; not merely for that part which is based on struggle.

On the other hand, of course, fighting may lose its normal spontaneity which so closely correlates, or even identifies, it with play. Like play, it may become work. This transformation may come about in either of two ways. If spontaneous fighting is prolonged, because of the necessity for defense, beyond the point where the organic exercise is pleasureable, and the body and mind become fatigued or exhausted, it may become exceedingly irksome. Fighting is truly recreative only if it results successfully or if it is desisted from before a radical degree of fatigue sets in. And as much can be said regarding play. In a second sense, fighting may be transformed into work, when it is carried on as a profession or occupation. The exercise of any professional or occupational technique may be recreative at first or until weariness sets in, especially if a surplus of energy is available and if its exercise involves a change, and even more particularly if the technique involves a form of social contact, as is the case in fighting. The healthy body and mind ordinarily go to work, after a sufficient period of rest and after refreshment, willingly or eagerly. But ultimately monotony and fatigue set in and the process which was play becomes a task.

Construction or workmanship is, if possible, even more closely related to play than is fighting. It is as general as play, in that it utilizes all of the coördinations which the individual ever develops. All play is, or may be, construction [1] in some

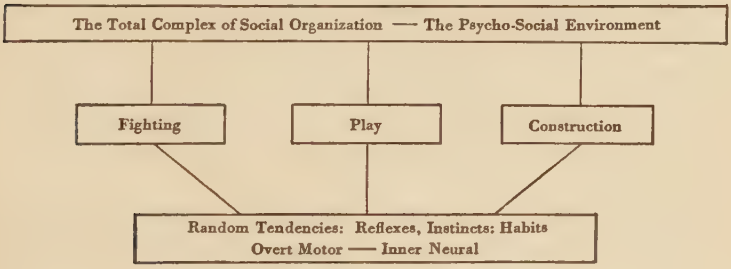
[1] Of course some play is destructive; but even destructive play may serve as training for construction.

form or other, but not all construction is play. Play is practice and is properly creative, consisting of the putting of things together in a new way, thus giving a new experience subjectively and a new coördination between the individual and his environment objectively. Construction does that also, at its best, but it may be merely repetitive as well as creative. Much construction is merely copy instead of creation, and it is often carried to the point of monotony and fatigue, to the extent that it becomes repulsive rather than stimulating. The work of the world cannot always be a game. Some social theorists and educators have thought that they could make all construction or workmanship a matter of creative play, but they misconceive the nature of society. The new must always be much smaller in volume and in contemporary significance than is the old and the monotonous and the repetitious. Yet, many more of the tasks of life could be given the aspect of creative play than now possess it. It is in this sense of creative play that many writers use the term construction.[1] When they so use it there is no valid reason for distinguishing it from play. When, on the other hand, it passes out of the category of play into application it uses the same elements of acquired technique or learned adjustments as those developed in play.

We are now ready to estimate the common activity elements in these three adjustment complexes so frequently called instincts. We find them peculiarly alike in the overt activity and mental technic processes which they employ. In fact, we observe that in large sections they are identical in the matter of technique, while at other points the fighting and construction activities make use of the technic processes developed in play. The technic processes of all three, however, are devel-

[1] Such is the sense, I take it, in which Veblen employs the term "instinct of workmanship." See *The Instinct of Workmanship*, Chap. I.

oped originally out of the random movements and the basic reflexes and instincts and previously functioning habits of the child under the molding influences of environmental pressures. Sometimes these environmental pressures act as units which become models for the imitation of the playing animal. At other times the pressures are imposed more or less disconnectedly or in multiple forms, in which instances we speak of the player as gaining experiences at random or under less controlled conditions. That is, he imitates less completely and more selectively and with more originality. But in either case his play is being built out of the random and other elemental tendencies, motor and neural, physiological and anatomical, under the organizing direction of a social environment. This situation may be diagrammed as follows:



For those who maintain, on one ground or another, that these activity complexes are instincts, some difficult questions must arise. The unsatisfactoriness of explaining the fact of the external environmental organization of the acts from the standpoint of instinctive dominance has already been pointed out in earlier chapters. The problem of harmonizing the fact that most of their constituent activity elements are learned with the supposed fact of the instinctive character of the activity complex as a whole cannot be solved, unless the difficulty just stated in this paragraph can be satisfactorily removed in favor of the instinctivists. But even if it should be

claimed that these complexes are instincts because they have a common instinctive basis or "core," it still remains to explain by virtue of what facts they may be regarded as separate instincts, since they all have the same instinctive basis or "core" in the random and the definite inherited and acquired tendencies. To be sure there are some definite inherited activity organizations which are utilized in these activity complexes (at least in many of their forms, although not in all), such as locomotion, biting, grasping, crying, but these are as common to one of the three divisions as to the other and cannot be said to give a characterizing quality to either division of activity or so-called instinct. Indeed, we should speak of these original units of activity as the true instincts and not of the organizations of activities which make use of them as instincts by virtue of their presence as constituent elements. Thus, fighting, playing, construction, each under various conditions, makes use of the instincts of biting, grasping, locomotion, crying, and the like, as well as of the random tendencies and acquired habits, which they organize into definite adjustment correlations.

This fact brings us back to a fundamental truth which has already been stated and which should now be clear from the abundance of illustrations. This is the fact that all the great synthetic socially organized activity and value complexes are made up of a mass of unit activities, some of which are inherited, but the great mass of which are acquired. Furthermore these activities, of either the general random class or of the type of specific adaptations, are interchangeable. The interchangeability of these units is the fact to be emphasized here. They do not belong to any particular activity complex or reputed "instinct." They are utilized by any of these activity complexes according to the need or the problem in adaptation. This fact becomes apparent upon the analysis of any other supposed "instinct" of the same general type as those consid-

ered here. We have had a tendency to think of activities as wholes, that is, as units, when often they were merely abstractions divisible into unit activities, which in turn must be subdivided and re-subdivided before it is possible to come to the ultimate indivisible organic structural units. When these are reached we find the true reflexes, some of which are organized into inherited series or instincts. These we find distributed again and again throughout all the larger complexes ordinarily termed instincts, either as original unit organizations or as subdivided elements entering into these acquired combinations.[1]

It is necessary to refer only casually to some of the other more common "instincts" in order to indicate their non-inherited character. Sociologists still speak of the gregarious or herd instinct, including therein groups of associative habits or tendencies together with certain instinctive responses. There are the tropic responses to temperature and tactual sensations, to those of odor and sight and sound. These tropisms undoubtedly play a part in the gregariousness complex. But it could not be seriously maintained that these tropic responses explain or dominate the most complex organizations of man, such as the upbuilding of our cities.[2] If they have the

[1] For illustrations of the interchangeability of activity elements within these three complexes here compared see the following chapter, especially the table of comparisons at the end of the chapter. Frequently the same constituent action pattern appears in all three of the complexes.

[2] McDougall, however, is of the opinion that the growth of cities is due to the gregarious instinct (*Introduction to Social Psychology*, 8th ed., ch. 12). It should be noted, however, that cities followed primarily upon the economic requirements of the industrial revolution and that those who have sufficient wealth to enable them to do so escape from the crowded life of the cities by removing their residences to the country, while their businesses remain in the city. But even if people were attracted to the city more by the wish for the satisfaction of their gregarious impulses and desires than by the motive of economic gain, this fact would not prove that gregariousness in any of its sophisticated and complex forms, such as we know it, is instinctive. The same compelling or driving satisfactions arise from habit organizations as from instinct organizations. The fact

power to bring people together in cities how can people stay apart in deserts? Why would they not come together there and perish? Why do they build individual houses for themselves in cities and protest so strongly against overcrowding, which only the silk-stockinged reformer imagines to be sought after by the poor? Is not rather the secret of large-scale associations (such as are typified in cities) to be found in the fact that social and economic and political environmental pressures encourage it in some places and discourage it in others? A melodrama or burlesque performance, grand opera or a political speech, will bring multitudes together, but who will say they come for the sake of the proximity to each other rather than for what they expect to secure from the performance in the way of the individual satisfaction of their emotions or mental interests? There is really less spontaneous association on the basis of instinct in a city than in the open country. In the city all sorts of precautions are vigorously employed to avoid the close instinctive contacts and to preserve a high degree of anonymity. The uncommunicativeness of the fellow traveler in crowded thoroughfares is puzzling to the ruralite, but it is puzzling to him because he has not yet experienced the destructively fatiguing effect of over-stimulation of the constituent gregariousness tropisms caused by their constant utilization and repetition in an unregulated crowd life of the city. Manifestly the crowding in the city is the product of external factors and that explanation which attributes it to inborn or instinctive factors must appear superficial indeed to those who are familiar with the nervous exhaustion and the consequent

---

of the increasing correlation of the functioning neural processes is alike true in either case, provided the activity is "successful," that is, if it is not interrupted by some external factor or by some internal conflict. See M. F. Meyer, "The Nervous Correlate of Pleasantness and Unpleasantness," *Psy. Rev.*, 15:366; also L. L. Bernard, *The Transition to an Objective Standard of Social Control*, ch. 2. For an explanation of the growth of cities not based on the "instinct" of gregariousness see E. A. Ross, *Social Control*, 19.

disgust with any sort of social contacts which over-gregariousness tends to produce.[1]

The so-called altruistic instinct has as little evidence to support its existence as has the supposed instinctive character of gregariousness. That there are strong altruistic attitudes in man no one could deny. Yet we find no definite correlation between this shifting complex of attitudes and the types of acts which call it forth. A beggar may at one time receive relief from our purse and elicit our tears. At another time we become angry at the sight of him and call the police. On the basis of an instinctive explanation of altruism it would be difficult to account for the fact that among one people parents are eaten and among another carefully guarded through old age to death and buried with the tenderest ceremonies after death; or the fact that your own dog is always welcome and a strange dog is chased away. Manifestly, altruistic activities and attitudes are mainly selected by a social or a personal evaluation on the basis of association or experience. If altruism were instinctive, the altruistic act would be performed toward the tramp quite regardless of whether he were socially desirable, whether he was your friend or a stranger. Reason would not have to come in to decide the merits of a case if an instinct were in control.

We also face the difficulty of defining the altruistic act. If it were an instinct it must assuredly be a unit act, characterized by its own structure and functions. But we find no such act, however long or far we search for it in the dictionary of altruism. On the contrary, any act may be altruistic under some circumstances. Even taking the lives of others may be altruistic, at least to some one, as in war or where a death-to-death personal struggle is going on. There is likewise no act

[1] W. T. Councilman (*Disease and Its Causes*, 240) has some pertinent remarks applicable to this subject.

which may not also constitute revenge under certain circumstances and there is no act which constitutes revenge under all conditions. Yet revenge is commonly classified as one of the instincts. More distressing still, the same act, performed by the same person, in the same instant may be both altruistic and revengeful with reference to different persons. What, then, constitutes the altruistic or revengeful nature of this act? Obviously it is not its external or internal structural constitution, for that is identical with reference to both meanings or definitions. It is, then, necessarily the social valuation which gives it character and this varies according to the object or effect of the act. Since any act whatever may play this dual rôle we cannot properly regard either altruism or revenge as an instinct. Both are rather *qualities*, perceived by society or the individual in its or his estimation of the values of the activity. The assumption of an instinct character for the act in this connection could further be controverted by means of analyses of the constituent elements of the act according to the methods utilized in this and earlier chapters; but this may be left to the reader himself, should he be interested.

The "instinct of self-preservation" is one of the most interesting of all the so-called instincts. It embraces every act that man may undertake which has a survival value. We have already shown that these same acts may be altruistic or revengeful, and we might as easily prove that they are criminal or virtuous, as circumstances warrant. If the analysis in the preceding paragraph be assented to, the "instinct of self-preservation" must perish by the same token as that by which the so-called instincts of altruism and revenge perished. Yet we do not deny the existence of acts of self-preservation when they are directed toward certain survival ends which can be clearly defined. We further maintain that activities under the control of reason, and especially learned activities under

rational control, are on the whole much more effective for self-preservation than are inborn activities in this modern complex world of explosives, street-cars and stock salesmen. Yet there are also instinctive acts and attitudes of a much simpler character which have self-preservative value. The tendency of the organism to be convulsed and to jump upon receiving a sudden shock or sound is one of these. With a certain amount of intelligent education this unreasoning reaction built up for employment in a relatively simple world of natural dangers can be made into an effective leap from in front of an automobile or otherwise made to preserve life under complex modern conditions. By analogy it may be said that some of the tropismatic attitudes, reflexes and simple instincts which function in gregariousness may function also in altruism. But the affective attitude which is so characteristic of conscious altruism is mainly or wholly acquired from association and is always attached to concrete objects and is in no way general, except as it may be abstracted to cover a class of concrete objects, in which case it is obviously derived instead of instinctive.

The fact seems to be, again, that the constituent acts utilized in self-preservative activity processes, whether instinctive or acquired, are not peculiar to or exclusively characteristic of these self-preservative processes. They belong to, or are utilized by, a multitude of other processes also. In fact, the activities which may be called self-preservative are so numerous and so all-embracing, in so far as type and organization of structure are concerned, that they may include within their scope, most other complex functional processes utilized in human activity. Consequently, the absurdity of speaking of an activity value, which is not even a single activity type in the aggregate and which has no structural individuality of its own, as an instinct must be immediately manifest. The activity content of self-preservation is even more interchange-

able than that of altruism or revenge. The only individuality which it may be said to possess is moral; that is, it resides in the value of any activity process, whatever its structural organization, which may be calculated to promote the interests and integrity of the individual or group concerned.

The "instinct to freedom," [1] is very similar to the "instinct of self-preservation," and may be disposed of by means of a similar analysis. The same is true of a large number of "instincts" belonging to the self-assertive and kindred groups.[2] The so-called acquisitive instinct, so often made use of by economic writers, has no firmer ground to stand on. In addition to what has been said above, we may point out in this connection the fact that each one tends to manipulate that which interests him. This is a part or function of the localizing processes. At first the baby focuses its localizations toward its mouth, because that organ is most frequently used in making adjustments to its major infantile interest, food. Later the hands become the chief organs of localization under the dominance of experience-getting through the tactile sense. Later still the two higher exteroceptive senses, sight and hearing,[3] dominate the localization processes, because localization, or coördinating adjustments, develop beyond the exclusive range of the tactile sense organs. But there remains a strong tendency to correlate these sight and hearing localizations with those of the hands, or rather to reinforce them with touch. The person who deals primarily in abstractions, such as the scholar, may lose this tendency wholly or with respect to all things except rare bindings or ancient editions. But those of us who live a more concrete and material existence never lose it with respect to the great majority of the objects which surround us, and those of us who are most material have it

[1] H. W. Nevinson, *The Growth of Freedom*, 71.
[2] See Chap. IX.
[3] Bernard, *op. cit.*, ch. 2.

strongly developed. We like to handle things. We like to be able to handle them again, and therefore we store them. Most of us are collectors of something, if it be only postage stamps or family histories. We of course collect what we are most interested in, that is to say, what our cumulative relationship to the great world around us seems to have emphasized as most valuable to us. Thus those with financial or economic traditions or experience, as well as those who have learned the value of money from bitter experience, collect money or credit, while others collect horses or jewels or beer steins and curiously carved pipes. It is very significant, in the light of our argument, that ordinarily those who are "closest fisted" are the persons who in their early days had a hard struggle to "get on" in the world.

The collecting or acquisitive "instinct" therefore is really only a habit complex, resulting from localization of experiences, the object of our collecting interests being determined by our dominant experiences in life. If we desired to argue against the existence of such an "instinct" on other grounds we might easily show that it is not an original unit but is a composite act and that it is dominated by the social situation. The chief instinctive content is the act of grasping, but we do not grasp everything indiscriminately. Nor do we literally grasp everything which we collect. We grasp for collecting purposes only those things which our experiences—our social environmental pressures—have taught us to value. If a child collects more different things than an adult, is it not because of the virgin and undisciplined and non-regimented character of his responses which are being organized under the direction of his play localizations? He has not yet standardized and delimited his experiences in conformity to the irrevocable and insistent demands of his narrowed adult environment. He seeks all experiences because he has not yet had all experience, and therefore all things look valuable to him—at least for a

while. But the collections—material and mnemonic—even of childhood are thrown aside in after life, because the standards of value—once so real—under which they were made have been dispossessed by a sterner and more insistent set of environmental needs.

The so-called or false instincts analyzed in this and the preceding chapters obviously constitute only a small number of those to which these types of analysis might properly be applied. But since our purpose is not to analyze all of the false instincts for the purpose of showing up the unscientific character of their claims to be included in a list of true instincts, but rather to select typical examples of erroneous usage as an illustration of our arguments, we need not proceed further in this particular direction. The reader or the student of instincts may now undertake to follow out a more complete analysis of doubtful instincts on the basis of the methods here illustrated, if he so desires. Meanwhile we may turn to an analysis of the instinctive elements in various types of activity and value complexes, with a view to illustrating two facts more clearly than has been possible hitherto. The first object is to show how small a part of the activity content of these activity complexes is really instinctive. The other object is to illustrate the interchangeability of the instinctive activity contents of these complexes.

CHAPTER XVI

SOME FALSE INSTINCTS EXPOSED—ANALYSIS OF CONTENTS

The argument regarding the current misuse of the term instinct and its application in very large measure to the acquired complexes which have most symbolic significance in our modern life can be made clearer by means of an analysis of some of the so-called instincts of a highly complex and variable character into their constituent elements. In this analysis a systematic presentation of only those constituent elements which are claimed to be of a reflex or instinctive character will be attempted. The reason for this limitation is obvious enough. If the admittedly acquired elements of these activity complexes and value concepts were also included, however useful they might be for purposes of comparison, they would in all cases, embrace practically the whole range of human activities. For it is patent enough, at least upon reflection, that one may employ the various types of locomotion in fighting activities, or the different forms of submission or aggression, or of gregariousness or pugnacity, in achieving sex ends. The present writer, in presenting these analyses of the supposed inherited constituent elements of the complex and variable "instincts" does not thereby indicate his own acceptance of these analyses. In fact he is inclined to question most of them in greater or less detail.

The term instinct was, of course, formerly used in a general sense to indicate the innate as over against the acquired elements in behavior. This usage appears to go back to the beginnings of philosophic writings among the Greeks, and it is

much older than the use of the term instinct as applied to concrete activity processes, that is, the specific instincts. The equivalent of our modern general term instinct occurs in the writings of Plato, Aristotle and other Greek philosophers, and we find traces of it in the writings of the middle ages. In the eighteenth century the term—still used mainly in its more general sense—becomes much more common. Helvetius,[1] Hartley [2] and the Scotch metaphysicians [3] especially make use of it. Herder [4] devotes a chapter to its discussion. There is evidence of the popular use of the term instinct as early as the sixteenth and seventeenth centuries. The word instinct occurs in Shakespeare's plays between seven and ten times. Hume [5] makes fairly frequent use of the concept as a general term for innate tendencies, but he scarcely ever employs it with any concrete or specific structural reference or content. It was not until the nineteenth century, when the study of psychological processes emerged from philosophic argumentation and introspection under the influence of biological experimentation, and when the study of neurology and physiology in general shook off the cloying superstitions of the metaphysics of the old mechanists,[6] on the one hand, and of vitalism, on the other,[7] (to say nothing of the older theological and metaphysical superstitions of an external personal fiat or a world principle or Natural Law [8] ruling the actions of man from with-

[1] *L'Esprit* and *L'Homme.*

[2] David Hartley, *Human Nature* and *Observations on Man.*

[3] Particularly Thomas Reid and Dugald Stewart.

[4] *Ideen zur Philosophie der Geschichte der Menschheit.*

[5] See, for example, *An Inquiry Concerning Human Understanding.*

[6] See Baron d'Holbach, *Systeme de la Nature* and *La Morale Universelle.*

[7] This "superstition" of vitalism can scarcely yet be said to have perished when one recalls, Hans Driesch's *The Science and Philosophy of the Organism* and Bergson's writings.

[8] The theory of a natural law pervading all space as harmony and acting as the principle of organization of both inorganic and organic matter, including also human and social relations, may be regarded as the logical successor of the older theological or personality explanation of happenings. This fact was indicated by Comte.

out) that thinkers and investigators began with any success to analyze and study the concrete activity processes. Then they began to describe the more detailed and specific correlations of the stimulus-response processes in terms of stimulus, response, metabolism, and the neural processes and complexes, instead of merely in such formal conceptual terms as ideas, memory, reason, etc., which were apprehended through introspection and could be measured subjectively only. The sciences of physiology and neurology and laboratory methods of investigation, added to the more general methods of observation and logical analysis, produced modern experimental psychology and biology, which has in turn given us a behavioristic analysis and interpretation of action.

The inevitable result of these refinements in the method of studying activity elements has been to advance the description of activity processes from general activity complexes and value concepts, mainly acquired, to the constituent elements of these complexes and concepts, both inherited and acquired. Just as more careful methods of analysis in physics and chemistry broke up the old unity concepts of matter, mass, force, motion, molecule, atom into their constituent elements and concepts, in an attempt to ascertain the underlying constituent processes and factors, so in the field of human and social behavior have the general valuations of activity and the general complex organizations of activity, so frequently referred to in preceding chapters, been broken up into their constituent elements by means of more refined methods of analysis. No one man is responsible for this line of analysis by which, for example, the general term or concept of instinct has come to have concrete meaning through differentiation and pluralization. The number of the workers in the field is legion. Among the earlier psychologists who followed this process of extended analysis may be mentioned W. Preyer (who studied the activ-

ities of children),[1] G. H. Schneider [2] and William James,[3] but they have been followed by a great host of psychological writers who, in the last two or three decades, have attempted to classify the instincts.[4] The discovery that the general concept could be broken up into so many constituent elements, on the one hand, and, on the other hand, the general ignorance regarding animal behavior in the concrete prevalent in his time, led James to declare that man had more instincts than the lower animals.[5] This mistaken view has of course been corrected by many writers on behavior, as the means of distinguishing between habit and instinct have been developed more fully.

However, James was in one sense on the right track. If man does not possess more instincts than the lower animals he at least possesses more than the earlier students of behavior ever dreamed of. James would perhaps himself be surprised, could he actually penetrate the limits of the "spirit" world and read the further analyses of this generation of behaviorists and see the extent to which they have multiplied the reflexes and instincts. And this multiplication occurred even at the time when many of the old so-called instincts were being eliminated. McDougall, with his twelve instincts, must really be regarded as a conservative, when compared with his contemporaries whose classifications with a more numerous content of instincts have been presented in a previous chapter.[6] His vogue is not due to the fact that he improved upon the analysis of instinct made by James and the followers of James in this country, but to the fact that he used the concept of instinct, with a highly systematic classification of instincts, emo-

[1] *Die Seele des Kindes;* also, *The Senses and the Will* and *The Development of the Intellect.*

[2] *Der Thierische Wille* and *Der Menschliche Wille.*

[3] *Principles of Psychology.*

[4] For a partial list of these classifications see Chap. VIII.

[5] *Op. cit.*, Chap. XXIV.

[6] Chap. VIII.

tions and sentiments, as the basis of a discussion of the building up of character or activity controls within the individual. The educationists, ethicists and sociologists were desperately in need of some raw materials in the nature of psychological processes out of which to construct a theory of training and character organization. They knew practically nothing as yet of the methods of environmental pressures, and when McDougall's theory, worked into a neat metaphysical system more or less after the manner of the school of the Scottish metaphysicians, was presented to them they embraced it enthusiastically. Many things have since aided them in unlearning their error. One of these factors has been the further analysis of the instinct concepts here to be presented. The men who have done most work in connection with this analysis and breaking up of the so-called complex instincts are Thorndike,[1] Alexander Shand,[2] R. M. Woodworth,[3] and Smith and Guthrie.[4] The analysis which follows is only partial. The purpose of the analysis is primarily to illustrate the method of procedure and its consequences for the current theory of instinct, rather than to attempt a complete list of constituent reflexes and instincts—a thing which, as earlier pointed out, cannot now be done.

First, we may consider the so-called instinctive components of the *herd* "instinct" or the "instinct" of *gregariousness*. Woodworth says that the following innate reactions are organized within the complex called the herd instinct: [5]

Uneasiness when alone
Seeking company
Remaining in company
Following the rest as they move from place to place

[1] *The Original Nature of Man*, especially chs. 6–10.
[2] *The Foundations of Character*.
[3] *Psychology*.
[4] *General Psychology in Terms of Behavior*.
[5] *Op. cit.*, 147.

Thorndike has a much longer list of instinctive components of the "instinct" of gregariousness. They are:[1]

Restlessness when alone
Wandering about
Satisfaction in the presence of a companion or a crowd
Interest in the behavior of others, such as
    Smiling
    Crying
    Jabbering
Attention-getting directed toward an inoffensive person by
    Approaching him
    Gesticulating
    Calling
    General restless annoyance
    Elaborate clothing
    Following the fashions in clothes
        " " " " furniture
        " " " " food
        " " " " manners
        " " " " morals
        " " " " religion
    Tipping
    Leisure class vicarious consumption
    Vicarious waste
Irritation at the absorption of another, manifested by
    Walking past him
    Ringing for a waiter
    Etc.
Satisfaction in admiring glances
    " " smiles
    " " pats
    " " admission to companionship
Discomfort from the withdrawal of approving intercourse
    " " scorn
    " " derision

[1] *Op. cit.*, 85–91.

Responses by approving behavior, such as

Smiling Encouraging shouts Respectful staring	to	Relief from hunger Rescue from fear Gorgeous display Instinctive acts of strength " " " daring Victory

Responses by scornful behavior, such as

Frowns Hoots Sneers	to	Observation of empty-handedness Deformity Physical meanness Pusillanimity Defect

Each specific act or attitude or group of acts and attitudes mentioned by Thorndike has been given a separate line in the classification here presented in order that its individuality may be preserved. Even at that it will be observed that in many cases the content of the act is by no means simple or unitary. For example the content of the act of hooting will vary according to the recognition content of the mind of the subject. This lack of unity and definiteness of the act is even more noticeable in connection with the supposed instinctive acts of attention-getting. Each of these may be performed in numerous ways and is so performed, the variation occurring as the perception of the attitude of the other person, whose attention is to be secured, varies. This general criticism may be made of practically every one of the so-called instinctive acts grouped under the general term of gregariousness. The question, therefore, arises as to whether they can be instinctive. If we answer in the affirmative, we must either assume that these supposed unit responses within the general term gregariousness are really composite groups, themselves including a number of specific reflexes which serve as specific

responses to corresponding specific types of stimuli, or that each specific stimulus or stimulus type may acquire substitute responses (and each specific response presumably acquire substitute stimuli) and the whole act yet remain an instinct.[1] If we accept the latter explanation, obviously we are not using the term instinct in the sense of a strictly inherited action-pattern. If, however, we adopt the former hypothesis, we are forced to admit that we are not dealing with instincts and reflexes, but we are still having to do with class terms which lack the definite and unitary character of organization which is essential to a true instinct. Thorndike himself admits that these responses do not easily remain uncontaminated. He says, "As in the case of all original tendencies, such behavior is early complicated, and in the end much distorted, by training." [2] He adds, "But the resulting total cannot be explained by nurture alone." [3] With this final conclusion we may agree, without having occasion to admit that this fact constitutes the activity terms here enumerated the original tendencies for which he is seeking. To the writer it seems that they lie farther underneath still and that the final original or instinctive elements of action are much simpler, that they are in reality reflexes. And as yet we have scarcely begun to study and classify the reflexes.[4]

[1] McDougall. *op. cit.*, ch. 2.
[2] *Op. cit.*, 90.
[3] *Ibid.*
[4] H. C. Warren (*Human Psychology*, 101) makes a very incomplete attempt of this sort. His classification is as follows:
Human Reflexes

A. Purest—least subject to central modification in adult.
"Pupillary" or iris reflex
Ear twitching (controlled in some individuals)
Hand withdrawal (to heat and pain)
Myenteric reflexes (operation of stomach and intestinal muscles in digestion)
Snoring
Shuddering
Starting (to sudden noise, etc.)

Closely associated in our thinking with the herd or gregarious "instinct" are those instincts and reputed instincts connected with *courtship* and *reproduction*. Woodworth has a rather loosely organized *courtship* "instinct" in his general

---

Trembling
Shivering
Rhythmic contractions (in epilepsy, paralysis agitans, etc.)

B. Largely pure—subject to inhibition or reinforcement
Winking
Accommodation, ciliary reflex
Eye-fixation and convergence
Hiccoughing
Sneezing
Patellar reflex (knee jerk)
Dizziness reflexes
Yawning
Vomiting
Facial reflexes (to bitter taste, etc.)
Salivation
Tickle reflexes
Hand twitching (to dermal pain)
Plantor reflex (to stimulus on sole of foot)
Great toe reflex
Vasomotor reflexes (blushing, paling)
Breathing changes (to specific stimuli and to onset of sleep)
Sudorific reflexes
Groaning
Laughing
Cramp movements
Squirming

C. Occasionally pure, more often centrally modified
Coughing
Swallowing and gulping
Visceral discharge, etc.
Functioning of sex organs
Reflexes to odors
Gasping
Weeping
Sobbing
Smiling
Wincing, etc.
Scowling
Stretching
Convulsive contractions (to deep pressure and heat, to pricking and other dermal pains, and to visceral pain)

classification of instincts. It is supposed to include the instinctive elements of [1]

Strutting
Decoration of the person
Demonstrating one's prowess, especially in opposition to rivals
Coyness

D. Pure in infancy, centrally modified in adult

Sucking	Tugging (wrist reflexes)
Biting and grinding	Clasping (elbow reflexes)
Spitting	Reaching (shoulder reflexes)
Hunger and thirst reflexes	Kicking (knee reflexes)
Lip and tongue reflexes	Stepping (gluteal reflexes)
Vocal reflexes	Jumping (ankle reflexes)
Turning the head	Sitting up
Tossing	Bending forward
Grasping (finger reflexes)	Rising

E. Posture reflexes
Holding head erect
Sitting
Standing
Equilibration

It may very well be doubted whether some of these are inherited, although all of them may come to have the automatic character which justifies us in speaking of them as reflexes, either inherited or acquired.

Smith and Guthrie, (*op. cit.*, 51–4), offer the following list of inherited reflexes, although they would probably not claim that it is a complete list.

Birth cry
Yawning
Sneezing
"Colic cry"
Crying due to hunger
pain
fatigue
cold plunge (inspiratory)
Vocalizations as follows (during first month): *m*, *n*, *ng*, *h*, *w*, *r*, *y*, *ow*, as in owl, *ee* as in feel, *oo* as in pool, *a* as in an, *a* as in father
Enteric responses (first day):
Swallowing
Hiccoughing
Regurgitation
Spitting out
Sucking
Licking
Defecation

[1] *Op. cit.*, 147–8.

Under the heading of courtship Jordan and Kellogg include [1]

Strutting
Spreading his fins
Intensifying his pigmented colors through muscular tension
} (by the male fish)

Singing of male
Struggle with other males for possession of the female
Struggle to the death for the possession of the female
" " " " " " mastery of the herd

It is not necessary to point out that here, as in the cases discussed in connection with the preceding analysis from

---

Binocular accommodation
Fixation of a light
Blinking in response to a threatening gesture
Rotating head away from source of light
Tears
Smiling
Raising head when face is buried in pillow
Finger movements
Grasping object touching the palm
Throwing arms toward head when dropped
" " " " " touching head
Avoidance movements of the arms
Kicking
Leg movements when abdomen is stimulated on same side
Stretching and arching in response to removal of clothing
Grasping when dropped
Holding breath when dropped
Turning over after being placed face down
Creeping backward
Placing the hand in the mouth
Rage responses (caused by holding arms or head) such as
Stiffening the body
Holding the breath
Thrashing with the arms and legs
Screaming

These reflexes were observed very early in the postnatal life of the child; many of them on the first day and nearly all of them within the first few days or weeks. Therefore they are supposed to be truly inherited rather than acquired.

It may be of interest to the reader to compare these two lists of reflexes with each other and both of them with the lists of elements contained in the reputed instincts analyzed in this chapter.

[1] *Animal Life*, 248–9.

Thorndike, we have complexes, consisting largely of learned organizations and syntheses, rather than simple unitary instinctive acts. Under the heading of *sex behavior*, which to be sure is a broader term, Thorndike includes the following supposedly native elements.[1]

Restlessness when spermatozoa have not been discharged for a certain period.
Attentiveness to human beings of the opposite sex.
Aggressive display in the male, consisting of
    Caressing pursuit
    Capture
Coy display in the female
    Coy advances
    Coy retreats
    Submission
Satisfaction in bodily contacts, including coitus.

Closely related to the courtship "instinct" and instinctive sex behavior as above outlined is the chain "instinct" of *copulation* analyzed by Smith and Guthrie.[2] According to these writers, who define the instinct as a variable chain of reflexes ending in a definite type of response or end act, all the constituent elements of the instinct are directed toward the consummation of the final act,[3] which in this case is copulation. Accordingly the two analyses of Woodworth and Thorndike last quoted should really be grouped under this supposed instinct, if we accept this definition of instinct. The constituent reflexes in the reputed instinct of copulation are presented for comparison:

Preliminary restlessness
Mating calls
Drumming by partridge

[1] *Op. cit.*, 98–9.
[2] *General Psychology in Terms of Behavior*, 65.
[3] *Ibid.*, 60, 64.

Strutting
Showing off
Dancing
Coyness of females
Fighting among males
Nuptial flight of some insects
Migration
Courtship
Affectionate behavior toward permanent mate

It will be observed that Woodworth's whole category of courtship is included by these authors as a single term under copulation. Jordan and Kellogg include under the heading of *reproduction* the following supposedly instinctive elements.[1]

Spawning
Ascending river for reproduction (anadromous instinct of salmon)
Female depositing her eggs in the gravel of some shallow brook
Courtship
Mating
Nestbuilding
Care of the young

Some of these reactions notoriously violate the demand for unity and definiteness in the instinctive response. This is particularly true of the "mating calls" and "coyness of females" of Smith and Guthrie which are further subdivided by Thorndike, and of submission or dancing, which may occur in more ways than can conveniently be mentioned. It is also evident that many reflex and instinctive elements have been left out of these lists. For example, nothing has been said about tumescence and detumescence, or about the automatic discharge of semen and other sex fluids in both the male and the female under certain conditions of stimulation.

[1] *Op. cit.*, 249–250.

Neither have they mentioned the vaginal and uterine contractions. Possibly also some of the clasping movements and other acts of adaptation in the process of copulation are reflex. It should also be pointed out that some of the display mechanisms and the "preliminary restlessness" listed under this general heading of courtship, copulation, or reproduction are not distinguishable, at least on the basis of the wording here used, from those display elements listed under the previous heading of gregariousness. This confusion of classifications is the phenomenon of which we spoke as interchangeableness in the preceding chapter. However, this interchangeableness would be permissible under the chain reflex theory of instinct of Smith and Guthrie. The essential question in this connection, therefore, is as to whether we can call an organization of activity processes, even if they are each and collectively inherited reflexes (a very generous assumption), which is formed by the environmental pressures an instinct. The constituent elements might be instinctive without the whole being an instinct, because it was not inherited as a unit. The question here raised is of the same general type as that which arose in Chapter VII in connection with the criticism of Hocking's theory of the central instincts or the central organization of instincts, which it was decided must have been brought about as the result of the action of acquired neural controls. The answer must, in both cases, be in the negative: such organizations of activity elements, based as they are directly or indirectly upon environmental controls, are not instincts or inherited psychophysical mechanisms.

If now we turn to the so-called maternal instinct we find that Thorndike again offers many more content units than Woodworth presents. Under the title of the *parental* or *mothering* instinct Woodworth lists [1]

[1] *Op. cit.*, 148.

Feeding the young
Warming the young } by the mother
Defending the young

Obviously these are highly complex groups of activities. Thorndike, under the title of *motherly behavior*, breaks these up into more elementary terms and adds others as follows:[1]

Instinctive interest in human babies by all women from early childhood to death
Responsiveness to instinctive looks
Responsiveness to instinctive calls, such as
    Cooing
    Gurgling
    Shouting of vocal play
Responsiveness to instinctive gestures of infancy and childhood
Responsiveness to instinctive cries of
    Hunger
    Pain
    Distress
    Fear
Responsiveness to instinctive smiles of comfort
Instinctive comforting acts to children in
    Pain
    Grief
    Misery
Instinctive satisfaction in
    Seeing
    Holding } a baby by a woman who has given birth to one
    Suckling
Instinctive cuddling the infant when it cries
Instinctive smiling when infant smiles
Instinctive fondling
Instinctive cooing } in return for the same responses
Instinctive interest and looking when infant points at objects
Instinctive holding of infant
Instinctive nursing

[1] *Op. cit.*, 81–4.

The above responses are supposed to be characteristic of the mother. But the *paternal* instinct also has its inning in the form of the following original tendencies: [1]

Offering a little child scraps of food
Watching a child eat
Snatching the child from peril by animals
Smiling approvingly at the child's more vigorous antics

The first two of the above responses would seem to be as characteristic of the man's attitude toward his dog as toward his child and for anything we know to the contrary from the data of social evolution, might just as well—or better, perhaps—have arisen in association with his dog than in connection with his child. Or, were the instinctive attitudes toward the child transferred to the dog after it had been domesticated? What little we know about the most primitive peoples, especially if we can assume that the maternal family predominated in the early history of mankind, would seem to justify the conclusion that the male's association with his dog was closer than that with his child.

A great many original or instinctive constituent responses have been worked out for fighting and anger. Woodworth mentions only three subdivisions of the *fighting* "instinct." These are very broad and general descriptive complexes as follows: [2]

Fighting against attack
Fighting to protect the young
Defensive fighting

Thorndike classifies a number of secondary instincts under the general heading of fighting and then subdivides these into constituent instincts and reflexes as follows: [3]

[1] Thorndike, *op. cit.*, 82–3. [2] *Op. cit.*, 160. [3] *Op. cit.*, 68–75.

Instinct to escape restraint by
- Stiffening
- Writhing
- Throwing back the head and shoulders
- Kicking
- Pushing
- Slapping
- Scratching
- Biting

Instinct of overcoming a moving obstacle by
- Dodging around
- Pushing with the hands
- Pushing with the body
- Hitting
- Pulling
- Slapping
- Kicking
- Biting

Instinct of counter-attack
Instinctive paralysis of terror
Irrational response to pain by an attack upon any moving object near at hand
Instinctive combat in rivalry
Threatening movements against another male of the same species during courtship.

Anger is closely associated with fighting. Shand finds the following instinctive elements in *anger*.[1]

Instinct of destruction
Instinct of approach
Instinct of attack
Overcoming opposition
Prevention of attack by
- Barking
- Shouting

[1] *Op. cit.*, 225–42.

Bristling
Etc.
Revenge or injury for past injury
Domination, to secure subjection of associates
Disinterested anger, usually in defense of the young.

Thorndike, drawing largely from Darwin, lists under the same heading of anger the following: [1]

Heart beat and circulation affected
Face reddens
Face becomes purple
Veins on forehead distended
Falling down dead
Respiration affected
Chest heaves
Nostrils dilate
Nostrils quiver
Muscles become stronger
Will becomes more active
Body held erect for instant action
Body bent forward toward the offending person
Limbs rigid
Mouth closed with firmness
Teeth clenched
Teeth ground together
Teeth grinning
Arms raised
Fists clenched
Menacing gestures
Striking objects
Hurling objects to ground
Children rolling on the ground on their backs
Children rolling on the ground on their bellies
Screaming
Kicking

[1] *Op. cit.*, 76–80.

Scratching
Biting
Trembling
Lips paralyzed
Voice sticks in throat
Voice loud
Voice harsh
Voice discordant
Mouth froths
Hair bristles
Frown on forehead
Eyes glare
Eyes glisten
Eyes protrude
Lips protrude
Lips retract
Snarling
Flow of tears
Spitting
Yelling
Slapping
Pulling objects
Shaking objects
Stamping
Jumping up and down
Hitting with the hand

Very similar also are the "instincts" of self-assertion and mastery. Woodworth finds four original constituent elements in the "instinct" of *self-assertion* as follows: [1]

Overcoming obstruction
Resisting domination by other persons
Seeking power over things
Seeking to dominate other people

[1] *Op. cit.*, 162–5.

Less in the nature of general classifications are the constituent elements of the "instinct" of *mastering* submitted by Thorndike, but still by no means in all cases are they the original or ultimate tendencies.[1]

Holding head up and a little forward
Staring at a person
Not looking at the person at all
Alternately staring and ignoring
Carrying on activities more rapidly and energetically
Making a display of activity
Going up to an unprotesting individual
Looking him in the eye
Nudging him
Shoving him
Satisfaction at the appearance and continuance of submission of those one meets
Obvious swagger
Strut
Glare of triumph
} when successful

Thorndike assures us that this conduct, classified under the "instinct" of mastery, "is much commoner in the male than in the female. In her the forward thrust of the head, the approach, displays of strength, nudging and shoving are also commonly replaced by facial expressions and other less gross movements." [2]

Of the same general character as mastery is the *defeating antagonists* "instinct" of Smith and Guthrie. Under it they list: [3]

Restlessness when alone and seeking company of fellows, resulting in herds and colonies
Secretions of skunk
Discharge of nematocysts

[1] *Op. cit.*, 92. [2] *Ibid.* [3] *Op. cit.*, 66.

Taking up posture which makes the animal seem more formidable
Snarling
Growling } (Often in defense of food)
Screaming
Cries that summon aid
Responding to cries for aid
Flexion of porcupine
Defensive grouping of herd
Attack with bill
Fighting with wings
Resisting forcible manipulation
Struggling
Squirming } when held
Biting
Retaliatory aggression

Two comments are appropriate at this point regarding the aggressive and self-assertive complexes listed in the pages immediately preceding. In the first place, although these classifications of elements are arranged under general headings which are spoken of as separate instincts, many of the constituent processes are apparently identical in different complexes. This is notably true as between fighting and anger, where perhaps one might reasonably expect it, but it is also true that these aggressive "instincts" have many elements in common with those of gregariousness, courtship and the mother's care of the child. A comparison of the lists, such as is made in the table at the end of this chapter, will show this to be the case. This fact would not seem so strange if it could be shown that these general complexes were organized in the inheritance, instead of under the dominance of environmental controls. But the unreliability of such an assumption has been shown in this and previous chapters. In the second place, it is quite clear that the elements of the so-called instincts listed here are, at least in many cases, themselves highly complex struc-

tural organizations or merely synthetic abstract terms used to describe and correlate many different activities having similar functions or contributing to a common or similar end. For example, the "retaliatory aggression" or the "responding to cries for aid" of the last list (to take a minimum of examples) may have as many structural forms of activity expression as there are situations. This confusion and incomplete analysis has been pointed out in other connections and will appear in connection with analytical lists of constituent reflex or instinctive elements later presented, but it cannot be too much emphasized, since it indicates so clearly that a classification of the instincts, as a basis for their constructive utilization in the theory and practice of social control, cannot be made until we cease to regard these complexes as ultimates in analysis. Just as physics and chemistry could not advance to their present stages of development until their general metaphysical concepts were broken up into more refined and detailed concrete processes which could be observed or controlled experimentally, so we cannot achieve a true science of biology, or of psychology, or of sociology until we proceed to deal in a similar way in these fields with such general value and synthetic metaphysical concepts as instinct.

On the borderline between self-assertion or aggression and submission are the reactions of self-defense, which partake of both the other two. Consequently we may expect to find some elements of both these "instincts" included. Under the general heading of the instinct of *self-defense* Jordan and Kellogg mention:[1]

> Impulse to make war on an intruder
> Desire to flee from enemies
> Fierceness of demeanor

[1] *Op. cit.*, 245–6.

Stealthy movements of the lion
Skulking habits of the wolf
Sly selfishness of the fox
Blundering good-natured power of the bear
Greediness of the hyena
Fear of hereditary enemies, as
    American bittern's fear of man
    Young mocking-bird's fear of owl or cat
    Monkey's fear of snake
    Man's fear of snake
Special instinct of resistance or method of keeping off its enemies, such as
    Stamping of sheep
    Kicking of horse
    Running in a circle of a hare
    Skulking in a circle of some foxes

It may seem peculiar—if we remember that an instinct is an inherited unit organization of structure basic to action—that we should have an instinct composed of the structural elements of two other instincts. But such would appear to be the case if we accept this as a bona fide instinct; and many writers do so consider it, as may be seen by consulting the list of so-called instincts in Chapter IX. There are also some fear "instincts" or reflexes included in this "instinct" of self-defense.

Presumably, the opposite of aggression or self-assertion is *submission*. Neither Woodworth nor Thorndike finds a large number of constituent elements for this reputed instinct. Woodworth lists only three:[1]

Giving up, in the face of obstacles
Docility of the child
Yielding to the domination of others

[1] *Op. cit.*, 167–8.

Thorndike does better:[1]

Lowering of the head and shoulders
Wavering glance
Absence of all preparations for attack
General weakening of muscle tonus
Hesitancy in movement

The dissimilarity of these two classifications is striking. Nor can one reasonably doubt that, as usual, Thorndike has gotten closer to the original elements than has Woodworth. In comparing the responses of the two sexes, Thorndike says, "Women in general are thus by original nature submissive to men in general."[2] This may be true, in spite of the changed order of things which has been brought about by the economic independence of women, but Thorndike has scarcely proved it.

The fear impulses are much more numerous. Under the title of *shrinking from injury* Woodworth lists the following:[3]

Winking
Scratching
Rubbing the skin
Coughing
Sneezing
Clearing the throat
Wincing
Limping
Squirming
Changing from an uncomfortable position
Cowering
Shrinking
Flight
Dodging
Warding off a blow
Huddling into the smallest possible space

[1] *Op. cit.*, 92. [2] *Ibid.*, 93. [3] *Op. cit.*, 142.

Getting under cover
Clinging to another person

Very similar is the list of Shand, characterized as "instincts organized under the emotion of fear," but with some differences of detail, and less nearly complete: [1]

Flight
Concealment
Silence
Clinging or keeping close to something
Shrinking or starting back
Immobility
Simulation of death
Crying for help
Disinterested fear for offspring—fighting at bay for offspring

Still similar, but much more detailed and much nearer to the original elements, is the classification of original fear elements of Thorndike: [2]

Withdrawal of attention from everything save the exciting situation
Running from the exciting object
Running to cover
Running to a familiar human animal
Crouching under something
Crouching behind something
Clutching
Clinging
Nestling
Starting—*i. e.*, a sudden tension of the muscles in general
Remaining stock-still, semi-paralyzed
Falling down
A screaming cry
Turning the head
Covering the head

[1] *Op. cit.*, 200–7.

[2] *Op. cit.*, 58–9.

Covering the eyes
Shuddering
Shivering
Trembling
Opening the mouth wide
Opening the eyes wide
Raising the eyebrows
Temporary cessation of breathing
Temporary cessation of heart-beat
Acceleration of breathing
Acceleration of heart-beat
Increased intensity of heart-beat
Difficulty in breathing, Paleness, Sweating } due to the contraction of the smooth muscles of the lungs and of the small arteries in the skin
Diminished action of the salivary glands
Erection of the hair

Thorndike might have mentioned also the muscular expulsion of excreta in extreme fear or terror, and sometimes the forward flexion of the body in such a way as to compress the visceral areas.

The so-called *disgust* instincts have many elements in common with the fear "instincts." Thorndike lists the following under this heading:[1]

Spitting out, Retching } in response to bitter and oily things in the mouth
Jumping back, Shrinking, Shuddering } from or at { Slimy things; Wriggling things; Creeping things on one's flesh
Turning away from the sight of putrid flesh, excrement, entrails
Turning away from the smell of putrid flesh, excrement, entrails

[1] *Op. cit.*, 54.

Shand's list is not so very different and it also bears a fairly close resemblance to the fear elements. It is given under the descriptive title of "instincts organized under the emotion of disgust," as follows:[1]

Instincts of ejection
- Vomiting
- Choking
- Spitting
- Blowing out disagreeable objects from the mouth

Instincts of withdrawal from contact
- Shrinking
- Shaking
- Cleansing
- Pushing away
- Scratching

Tendencies, partly acquired, of turning away
- Eyes
- Head
- Body

Under the heading "instincts of ejection" might also have been listed sneezing. The stimuli which apparently produce the operation of these particular instincts are bitter, sour, sickly-sweet, hot and cold objects in the mouth. The stimuli which initiate the withdrawal responses apparently are, among others, hot, cold, sticky, slimy and ill-smelling objects. Shand himself calls attention to the close similarity of fear and disgust responses.[2]

Related to the disgust reactions in function, and to some extent in structure, are the constituent reflexes and chains of reflexes in the so-called instinct of *cleanliness*, analyzed by Smith and Guthrie, as follows:[3]

[1] *Op. cit.*, 379ff.

[2] *Ibid.*, 379.

[3] *Op. cit.*, 66.

Licking the body
Dusting plumage
Preening
Scratching
Biting parasites
Shaking the wet paw by kittens
Picking at foreign objects on surface of body
Cleaning of eggs by ants
Rolling
Shaking
Scratching dirt over filth

The similarity of these elements to those of other so-called instincts may also be observed by comparison or by reference to the chart at the end of the chapter.

Somewhat similar to these elements just listed are those which Woodworth classifies as *responses to heat and cold:* [1]

Sweating
Flushing of the skin
Paling of the skin
Shivering
General muscular activity
Shrinking

The first two are responses to hot objects. The second two are responses to cold objects. The last two may be responses to either hot or cold objects. This classification obviously cuts across the one listed under the heading "disgust." The same may be said of the following list of responses from Thorndike: [2]

Response to sweet—sucking
Response to bitter—separating posterior portions of tongue and palate

[1] *Op. cit.*, 142.

[2] *Op. cit.*, 50.

Response to very sour
Response to very salt
Response to acrid
Response to bitter
Response to oily
} spitting and letting drool out of mouth

Response to food, when satisfied—turning head to one side in rejection of food.

Somewhat closely correlated at points with the above are the contents of the *hunger* instinct, as stated by Woodworth:[1]

Sucking
Swallowing
Chewing
Seeking the breast
Rejecting the breast
Spitting out bad-tasting food
Hunting, consisting of
    Crouching
    Stalking
    Springing
    Teasing (a mouse)
Food-storing

Two of the above elements are identical with elements in disgust and one with an "instinct" yet to be mentioned. Thorndike, as usual, finds a more numerous content for his *food-getting* instinct.[2]

Suckling
Seeking the breast
Reaching
Touching
Grasping
Putting into the mouth

[1] *Op. cit.*, 140–1.

[2] *Op. cit.*, 50–3.

Hunting, including

Pursuit
Pouncing upon } a small (or larger) escaping object
Grasping

Jordan and Kellogg's list of *feeding reflexes* is relatively brief: [1]

Protozoan absorbs smaller creatures which contain nutriment
Sea-anemone closes its tentacles over its prey
Barnacle waves its feelers to bring edible creatures within its mouth
Fish seizes its prey by direct motion
Animals reject poisons
Native ponies reject "loco-weeds" instinctively
Choking
Mauling } a moderate sized object
Cry of triumph over
Bringing captured object to some familiar human being
Cautious approach
Fighting
Advance
Protective behavior
Collecting
Hoarding

The "instinct" of *swallowing food* of Smith and Guthrie is inclusive of an even wider range of constituent elements, due perhaps to the fact that the authors require unity only in the end response—swallowing—which alone gives definition to the "instinct." The list of component activities is as follows: [2]

Suckling
Following while suckling
Mouth gaping by young birds
Crying and whining of young
Licking

[1] *Op. cit.*, 244–5.

[2] *Op. cit.*, 64–5.

Scratching the ground
Restlessness due to hunger
Following a scent
Striking by snakes
Striking by fish
Driving by birds
Stinging by insects
Sucking by insects
Grasping
Constriction by snakes
Biting
Pecking
Stalking
Tongue movements of lizards and frogs
Chasing
Creating water currents
Seizure due to contact
Hunting cry of owls and lions
Web building
Carrying home food
Migration
Crouching
Lying in ambush
Springing
Lapping
Chewing
Grazing
Rumination
Fighting and intimidating possible competitors
Threatening wing movements of pigeons while eating
Hunting in packs

The surprising thing about this reputed instinct of swallowing food, is not the length of this list of the constituent elements but its brevity, when we remember that any supposed chain of reflexes which ends in swallowing food may compose such an instinct. Why did not the authors include most of

the other reflexes also? Surely they might have been made in some way to aid in the procuring or preparation of food for swallowing.

Thorndike's classification of the elements of food-getting is very similar in many respects to his classification of the instinctive *acquisitive responses*, which are listed as follows:[1]

Approach
Reaching
Touching
Grasping
General manipulation
Putting in the mouth
Pulling, Twisting } in struggle
Pushing away, Striking, Screaming at } an opponent

It is difficult to determine where, in our sequence of classifications, the "instinct" of *securing shelter*, analyzed by Smith and Guthrie,[2] belongs. Some of its elements suggest gregariousness. Others resemble fear elements, and others still the collecting and workmanship "instincts." The list is presented here largely for convenience:

Restlessness in the open
Stereotropisms
Retirement to shelter in response to darkness
Seeking a roost high above ground
Burrowing and excavating
Cocoon spinning
The use of secretions in building
Caterpillar's use of leaves in building

[1] *Op. cit.*, 51.

[2] *Op. cit.*, 65.

Collecting building materials such as mud, sticks, leaves, hair
Rearranging these into nests and dens, in trees, on ground, in burrows
Plucking fur and down from breast for lining nest
Dam building by beavers
Yarding by moose
Huddling by cattle
Coöperative nest building of insects

In this connection, perhaps, should also be included the list of the supposedly original elements of the *climatic* "instinct," as given by Jordan and Kellogg. The list follows: [1]

Long swim of fur-seal to southward in winter
Migration of wild geese, as follows:
    Ranged in wedge-shaped flocks
    Flying high and far
    Calling loudly as they go
Migration of bobolinks, as follows:
    Straggling away one at a time
    Flying mostly at night
Hibernation of bear, as follows:
    Hiding in a cave or hollow tree
    Sleeping till spring
Moving north, Singing, Mating, Building nests } by birds in spring

The *walking* "instinct" also has its native constituent elements, one of which—holding up the head—is also to be found in self-assertiveness. According to Woodworth, the contents of the walking "instinct" are: [2]

Holding up the head
Sitting up
Kicking with an alternate motion of the legs
Creeping

[1] *Op. cit.*, 248.

[2] *Op. cit.*, 152–3.

Woodworth also has an "instinct" of *manipulation* which consists of the following original elements: [1]

Turning things about
Pulling objects
Pushing objects
Dropping objects
Throwing objects
Pounding with objects

Somewhat related also is his "instinct" of *exploration* or *curiosity*, which contains: [2]

Examination of objects by the hand
Examination of objects by the mouth
Examination of objects by the eyes
Examination of objects by the ears
Examination of objects by other senses
Listening to a sudden noise
Following a moving light with the eyes
Fixing the eyes upon a bright object
Exploring an object visually by looking successively at different parts of it
Exploration by the hands
Exploration by the mouth
Sniffing an odor
Asking questions

Some of these terms are doubtless duplications. They are presented here without elimination because they are stated separately in the text.

Play is closely related to manipulation and exploration and curiosity, functionally considered at least. Under the heading of the play instinct, Jordan and Kellogg include: [3]

[1] *Ibid.*, 154.

[2] *Ibid.*, 154–5.

[3] *Op. cit.*, 247–8.

Wrestling, Mimic fights } of { Young dogs, Bear cubs, Seal pups, Young beasts generally

Playing with mice by cats and kittens

Playing in trees by squirrels

Impaling of small birds and beetles on the thorns about its nest by the shrike or butcher-bird

Talking, Imitation of sounds } by parrots

Singing of birds

Crying, Calling, Howling } of animals

Thorndike has a classification of *original satisfiers* and another of *original annoyers*. Satisfaction and annoyance are, of course, not unit activities or concrete inherited unit organizations. Consequently they cannot be spoken of as instincts, although, like imitation, they may, in many cases, be dependent upon instinctive constituent processes. Such instinctive constituent elements of the annoyers are assigned as follows:[1]

Sensory pains

Bitter tastes

Sight, Touch, Smell } of { excrement, entrails, putrid flesh, blood, pus

Touching slimy things

Depression due to

- Grief
- Fear
- Absence of human beings
- Disapproving behavior of others

[1] *Op. cit.*, 123, 130.

Very intense sensory stimuli of all sorts
Being checked in locomotion by an obstacle
Hunger

A corresponding list of the original satisfiers may be stated as follows:[1]

Sweet, Meaty, Fruity, Nutty } tastes
Glitter, Color, Motion } in objects seen
Being rocked
" swung
" carried (in childhood)
Rhythm in percepts
Rhythm in movements
Elation
Presence of other human beings
Manifestations of satisfaction of other human beings
Approving behavior of other human beings
Being with familiar rather than with strange persons
Moving, when refreshed
Resting, when tired
Being "not altogether unenclosed" when resting and at night

It is to be expected, of course, that these original elements would cut across the other classifications of original or instinctive elements of supposedly specific instincts outlined above. Satisfaction and annoyance arise from the performance of any sort of activities under certain circumstances. They are as relative as the feeling tones which give them their character-

[1] *Ibid.*

istic organization and direction. It will be noted, in reviewing these two classifications, that Thorndike not infrequently confuses the process with the stimulus to the process. For example, in his list of original satisfiers he speaks of sweet tastes and glittering objects as giving rise to satisfaction instinctively. This is a correct assumption. But he also speaks of elation and of resting when tired as original satisfiers. These, however, constitute the process of satisfaction itself; they are not stimuli to it.

By way of summary, attention may be called to the following facts. First, many of the supposedly instinctive and reflex or original elements listed as constituent elements of the more general "instincts" or activity and value complexes are not themselves unitary, concrete and definite inherited processes. They are also frequently class names of groups of activities, which may or may not be inherited, or of value concepts relating to types of activities, functionally, but not structurally, considered. This fact was illustrated from time to time in the body of the chapter and merely requires summary mention at this point. The implication is that the work of analyzing the instincts into their constituent elements is not yet finished. Apparently it is only just begun. Even the writers here cited and quoted attempt an analysis of only a few instincts. Yet, a relatively complete preliminary analysis, however much it must later be revised in the direction of a more detailed analysis, is necessary before we shall be ready to make accurate use of the concept and data of instinct in the processes of character building and social control.

Second, the mistaking of acquired action or value processes for inherited action patterns of a unitary character is very manifest from the material here presented. This observation applies not only to the more general or class terms here called instincts, and which manifestly are not instincts, but also to

the supposedly instinctive constituent elements themselves. As has already been shown, the definition of instinct in terms of the end activity or of the central control mechanism, both of which are supposed to organize and utilize chains or sets of reflexes, does not solve the problem or obviate the objection to the complexity and variability or even the abstractness of the content of the constituent processes. Inherited unit mechanisms do not act in such a way.

Third, the lack of agreement among the writers as to what are the instinctive elements of the more general "instincts" is sufficiently marked to call for further analysis and classification in the hope of arriving at some consensus of opinion. The diversity of opinion in this regard is strikingly illustrated by the detailed classifications listed above and will be made further apparent by the tabular analysis which follows. A lack of agreement so striking constitutes a clear demonstration of the chaotic state of the theory of instincts.

Fourth, the different writers vary greatly with respect to the degree of concreteness or generality involved in the constituent elements which they classify as instincts. This difference doubtless in part indicates a difference in the character of their conceptions regarding the nature of instinct. But it also illustrates the difference in the degree to which they have analyzed the activity processes which are classed as instinctive.

Fifth, it seems clear from the exhibit that those activity processes classified under the headings which denote vegetative or other concrete survival functions are much more likely to be truly unitary and definitely instinctive than are those classified under the more general headings indicating social functions or processes or values. This contrast can be observed by examining the contents of the so-called herd or parental instincts as compared with those of walking or food-getting. The reason for this difference in concreteness unquestionably

is that the social functions, having to be apprehended more abstractly and indirectly than the other functions, have not yet been subjected to analysis by so concrete a technique. This fact follows the general principle of the greater generality and abstractness of social phenomena as contrasted with biological.

Finally, the overlapping or interchangeability of the elements of the various general "instincts" is also easily observable. In order that this fact may be rendered more graphic a tabular analysis of the recurrent or interchangeable terms in these classifications follows. Such interchangeability would not exist if the supposed general instincts were really inherited unit activity organizations. Logically such overlapping is possible for the content of acquired complexes, but biologically it is not possible for true instincts or inherited unit activity mechanisms. The tabular presentation follows:

INTERCHANGEABILITY OR OVERLAPPING IN CLASSIFICATIONS OF CONSTITUENT ELEMENTS OF THE "INSTINCTS"

Reflexes or elements which are variously classified	"Instincts" under which these constituent elements are classified	Description of constituent elements under each general "instinct"
Fighting	—Copulation	Fighting among males
	—Courtship	Struggle to death for possession of female
	—Defeating antagonists	Fighting with wings
	—Fear	Fighting at bay for offspring
	—Feeding	Fighting
	—Fighting	Against attack, to protect the young
	—Hunger	Hunting—fighting
	—Play	Mimic fights of young dogs, bear cubs, seal pups, young beasts generally
	—Swallowing food	Fighting and intimidating possible competitors

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Cry, crying, yelling, calling, howling	—Anger	Yelling
	—Copulation	Mating calls
	—Defeating antagonists	Cries that summon aid
	—Fear	Crying for help, a screaming cry
	—Feeding	Cry of triumph over a moderate sized object
	—Gregariousness	Calling to get attention of inoffensive person
	—Play	Crying, calling, howling of animals
	—Swallowing food	Crying and whining of young, hunting cry of owls and lions
Approach	—Acquisitive responses	Approach
	—Anger	Instinct of approach
	—Feeding	Cautious approach, advance
	—Gregariousness	Attention-getting directed toward an inoffensive person by approaching him
	—Hunger or food-getting	Hunting—advance, cautious approach
	—Mastering	Going up to an unprotesting individual
Restlessness	—Copulation	Preliminary restlessness
	—Defeating antagonists	Restlessness when alone and seeking company of fellows, resulting in herds and colonies
	—Gregariousness	Restlessness when alone
	—Securing shelter	Restlessness in the open
	—Sex behavior	Restlessness when spermatozoa have not been discharged for a certain period
	—Swallowing food	Restlessness due to hunger

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Biting	—Anger	Biting
	—Cleanliness	Biting parasites
	—Defeating antagonists	Biting, when held
	—Fighting	Instinct to escape restraint and to overcome moving obstacles by biting
	—Swallowing food	Biting
Pushing, shoving	—Acquisitive responses	Pushing away an opponent
	—Disgust	Instinct of withdrawal of contact—pushing away
	—Fighting	Instinct to escape restraint and to overcome moving obstacle by pushing with the hands, pushing with the body
	—Manipulation	Pushing objects
	—Mastering	Shoving, nudging a person
Scratching	—Anger	Scratching
	—Cleanliness	Scratching dirt over filth
	—Disgust	Instinct of withdrawal of contact—scratching
	—Fear	Shrinking from injury—scratching
	—Fighting	Instinct to escape restraint by scratching
Striking, slapping, hitting, mauling	—Acquisitiveness	Striking opponent
	—Anger	Striking objects, hitting with the hand, slapping
	—Feeding	Mauling a moderate sized object
	—Fighting	Instinct to escape restraint and to overcome moving obstacles by hitting, slapping
	—Swallowing food	Striking by fish, snakes

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Cowering, crouching	—Fear	Crouching under something, behind something
	—Hunger	Crouching in hunger
	—Shrinking from injury	Cowering
	—Swallowing food	Crouching
Display	—Copulation	Showing off
	—Courtship	Demonstrating one's prowess in opposition to rivals
		Spreading fins, intensifying pigmented colors through muscular tension by fish
	—Mastering	Making a display of activity
	—Sex behavior	Aggressive display in male, consisting of caressing, pursuit and capture; coy display in the female by advances, retreats, submission
Kicking	—Anger	Kicking
	—Fighting	Instinct to escape restraint and to overcome moving obstacle by kicking
	—Self-defense	Kicking of horse
	—Walking	Kicking with alternate motion of the legs
Pulling	—Acquisitive responses	Pulling in struggle
	—Anger	Pulling objects
	—Fighting	Instinct to overcome moving obstacle by pulling
	—Manipulation	Pulling objects
Satisfaction	—Gregariousness	Satisfaction in presence of a companion or a crowd; in admiring glances, smiles, pats, in admission to companionship

OVERLAPPING IN CLASSIFICATIONS OF THE "INSTINCTS"—*Cont.*

Reflexes or elements which are variously classified	"Instincts" under which these constituent elements are classified	Description of constituent elements under each general "instinct"
Satisfaction	—Mastering	Satisfaction at the appearance and continuance of submission of those one meets
	—Motherly behavior	Satisfaction in seeing, holding, suckling a baby by one who has given birth to one
	—Sex behavior	Satisfaction in bodily contacts, including coitus
Screaming	—Acquisitiveness	Screaming at an opponent
	—Anger	Screaming
	—Defeating antagonists	Screaming
	—Fear	A screaming cry
Spitting	—Anger	Spitting
	—Disgust	1. Spitting out in response to bitter and oily things in the mouth 2. Instinct of ejection—spitting
	—Hunger	Spitting out bad-tasting food
	—Response to very sour " " " salt " " " acrid " " " bitter " " " oily	Spitting
Sucking, suckling	—Food-getting	Suckling, seeking the breast
	—Hunger	Sucking
	—Response to sweet	Sucking
	—Swallowing food	Suckling, sucking by insects
Attack, aggression	—Anger	Instinct of attack
	—Defeating antagonists	Attack with bill, retaliatory aggression
	—Fighting	Counter-attack

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Coyness	—Copulation	Coyness of females
	—Courtship	Coyness
	—Sex behavior	Coy display in females—advances, retreats, submission
Defense of young	—Fear	Disinterested fear for offspring—fighting at bay for offspring
	—Fighting	Fighting to protect the young
	—Parental	1. Defending the young by the mother 2. Snatching the child from peril by animals
Flight	—Copulation	Nuptual flight of some insects
	—Fear	Flight
	—Shrinking from injury	Flight
Grasping	—Acquisitive responses	Grasping
	—Food getting	Grasping in hunting
	—Swallowing food	Grasping
Hunting	—Food-getting	Pursuit of, pouncing upon, grasping a small (or larger) escaping object
	—Hunger	Crouching, stalking, springing, teasing
	—Swallowing food	Hunting in packs
Manipulation	—Acquisitive responses	General manipulation
	—Exploration or curiosity	Examination of objects and exploration by the hands, mouth, etc.
	—Manipulation	Turning things about

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Migration	—Climatic	Migration of wild geese ranged in wedge-shaped flocks, flying far and high in air, calling loudly as they go; of bobolinks, straggling away one at a time, flying mostly at night
	—Copulation	Migration
	—Swallowing food	Migration
Nest-building, securing shelter	—Climatic	Building nests by birds in spring
	—Reproduction	Nest-building
	—Securing shelter	Coöperative nest-building by insects
Putting into mouth	—Acquisitive responses	Putting in mouth
	—Exploration—curiosity	Examination of objects and exploration by means of the mouth
	—Food getting	Putting into the mouth
Resistance	—Defeating antagonists	Resisting forcible manipulation
	—Self-assertion	Resisting domination by other persons
	—Self-defense	Stamping of sheep, kicking of horse, running in circle of hare, skulking in circle of some foxes
Shrinking, wincing	—Disgust	1. Shrinking from or at slimy things, wriggling things, creeping things on one's flesh 2. Instinct of withdrawal from contact—shrinking
	—Fear	Shrinking, wincing from injury
	—Responses to heat and cold	Shrinking

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Singing	—Climatic	Singing by birds in spring
	—Courtship	Singing of male
	—Play	Singing of birds
Smiling	—Gregariousness	Smiling at relief from hunger, rescue from fear, gorgeous display, acts of strength and daring, victory
	—Motherly behavior	When infant smiles
	—Paternal	Smiling approvingly at child's vigorous antics
Squirming, writhing	—Defeating antagonists	Squirming when held
	—Fear	Squirming
	—Fighting	Instinct to escape restraint by writhing
Staring, glaring	—Anger	Eyes glare
	—Gregariousness	Respectful staring
	—Mastering	Staring at a person, looking him in eye
		Glare of triumph when successful
Strutting	—Copulation	Strutting
	—Courtship	Strutting
	—Mastering	Strut
Care of the young	—Mothering	Feeding, warming, defending the young
	—Reproduction	Care of the young
Chewing	—Hunger	Chewing
	—Swallowing food	Chewing
Courtship	—Copulation	Courtship
	—Reproduction	Courtship
Decoration of the person	—Courtship	Decoration of the person
	—Herd or gregarious	Attention-getting by 1. Elaborate clothing 2. Following the fashions in clothes

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Domination	—Anger	Domination, to secure subjection of associates
	—Self-assertion	Seeking to dominate other people
Erection of the hair	—Anger	Hair bristles
	—Fear	Erection of the hair
Fear	—Fear	Disinterested fear for offspring
	—Self-defense	Fear of hereditary enemies
Flushing of skin	—Anger	Face reddens, face becomes purple
	—Responses to heat and cold	Flushing of the skin
Following	—Gregariousness	Following the rest as they move from place to place
	—Swallowing food	Following while suckling
Frowning	—Anger	Frown on forehead
	—Gregariousness	Frowns at empty-handedness, deformity, physical meanness, pusillanimity, defect
Hoarding, collecting	—Feeding	Hoarding, collecting
	—Securing shelter	Collecting building materials, such as mud, sticks, leaves, hair
Holding up the head	—Mastering	Holding head up and a little forward
	—Walking	Holding up the head
Interest in behavior of others	—Herd or gregarious	Interest in behavior of others, such as screeching, crying, jabbering
	—Parental or mothering	1. Responsiveness to instinc-

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
		tive calls, cries, smiles of comfort, looks, gestures } of infancy and childhood
		2. Instinctive comforting acts to children
		cuddling when infant cries
		smiling, fondling, cooing } in response to similar behavior
		looking when infant point at objects
		watching child eat
		smiling at child's antics
Licking	—Cleanliness	Licking the body
	—Swallowing food	Licking
Mating	—Climatic	Mating by birds in spring
	—Reproduction	Mating
Modifications in breathing and heart-beat	—Anger	Respiration and heart-beat affected
	—Fear	Temporary cessation, acceleration and difficulty of breathing, temporary cessation, acceleration and increased intensity of heart-beat
Muscular activity	—Anger	Muscles become stronger
	—Responses to heat and cold	General muscular activity
Overcoming opposition	—Anger	Overcoming opposition
	—Self-assertion	Overcoming obstruction

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Paling of skin	—Fear	Paleness
	—Responses to heat and cold	Paling of skin
Paralysis	—Fear	Remaining stock-still and paralyzed
	—Fighting	Instinctive paralysis of terror
Reaching	—Acquisitive responses	Reaching
	—Food getting	Reaching
Rejecting	—Feeding	Rejecting poisons, loco weeds
	—Hunger	Rejecting the breast
Running	—Fear	Running from exciting object, to cover, to a familiar human animal
	—Self-defense	Running in circle of hare
Seeking the breast	—Food getting	Seeking the breast
	—Hunger	Seeking the breast
Shaking	—Anger	Shaking objects
	—Cleanliness	Shaking the wet paw by kittens
Shivering	—Fear	Shivering
	—Responses to heat and cold	Shivering
Shuddering	—Disgust	Shuddering from or at slimy things, wriggling things, creeping things on one's flesh
	—Fear	Shuddering
Snarling, growling	—Anger	Snarling
	—Defeating antagonists	Snarling, growling in defense of food
Stamping	—Anger	Stamping
	—Self-defense	Stamping of sheep

OVERLAPPING IN CLASSIFICATIONS OF THE " INSTINCTS "—*Cont.*

Reflexes or elements which are variously classified	" Instincts " under which these constituent elements are classified	Description of constituent elements under each general " instinct "
Stiffening	—Anger	Limbs rigid
	—Fighting	Instinct to escape restraint by stiffening
Talking	—Gregariousness	Jabbering
	—Play	Talking by parrots
Throwing, hurling objects	—Anger	Hurling objects to the ground
	—Manipulation	Throwing objects
Touching	—Acquisitive responses	Touching
	—Food getting	Touching
Trembling	—Anger	Trembling
	—Fear	Trembling
Turning head	—Disgust	Tendencies, partly acquired, of turning away the head
	—Fear	Turning the head
Withdrawal	—Disgust	Consisting of shrinking, shaking, cleansing, pushing away, scratching
	—Fear	Withdrawal of attention

It should be noted that, in the table which precedes, the same reputed reflex element occurs in the most diverse instincts. For example, *fighting* is listed as a constituent element in nine separate "instincts" and five of these are not even obviously related. The element *approach* is a constituent of such definitely separate or even opposed "instincts" as acquisitiveness and gregariousness, anger and feeding. Since these supposed instincts, defined in terms of their end results or the objective of the activity, have been shown to vary in their process content according to the circumstances of the act,

it is clear that they are not unit characters or instincts at all, but complexes assembled under the dominance of the environment. The interchangeability of their constituent elements tends to confirm this interpretation. The same generality and acquired nature may be predicated, in most instances at least, of the constituent elements also. In only a few cases are they true or separate and indivisible reflexes. In some instances they appear in both the column of the reflexes and in that of the instincts, a further evidence of the great confusion existing in this subject.

CHAPTER XVII

SOME FURTHER MISCONCEPTIONS CONCERNING THE NATURE OF INSTINCT

There are certain additional difficulties in the way of regarding many of the activity and value complexes as instincts which do not appear to have been adequately considered and met by the instinctivists. Some of these would appear to be fatal to a theory of instincts, such as that set forth by McDougall or Veblen, which includes the learned activity content, and even the generalized meaning or value content, in the so-called instinct itself. It seems desirable at this point to review some of these underlying assumptions of the instinctivists and point out the errors they contain.

One of the most common assumptions is that distinctively harmful, even primarily destructive, dispositions, could survive in the race heredity as instincts. This popular view has been generally disputed by the biologists and other trained scientists who have examined the question. The writer once heard a learned professor of geology make the statement in a Sigma Xi address that there were no feeble-minded people in primitive groups because the conditions of natural selection would immediately eliminate them in the struggle for existence before they reached the breeding age.[1] He continued by saying that our unwise artificial selection through charity is allowing those possessed of the inherited feeble-minded taint to

[1] This statement was made in support of the contention that the *pithecanthropus erectus* was a true serial or evolutionary type, not merely a contemporary idiot whose bones had been preserved, as had been suggested by some writers seeking to discredit the "missing link" theory.

perpetuate their kind and to multiply at the expense of the normal breeds. A similar view is expressed by Geddes and Thompson:[1] "In wild nature there is very little disease, unless we include parasitism. Unhealthy and defective creatures are speedily eliminated, and there is no hereditary accumulation of weakness or vice. In mankind this socially merciful selection is in great part evaded by society itself, and in many ways, from philanthropic to legal, all of which we are now beginning seriously to criticise, morbid tendencies accumulate." If we take literally these statements as to the eliminating effect exercised through natural selection upon feeble-mindedness and disease under natural conditions, it is difficult to see how there could be left any of these defective strains at all in the race at present. If half a million years (assuming man to have been on the earth at least that long to say nothing of the period in which his pre-human ancestry lived before him) has not been a sufficient period in which to eliminate these traits, how can the eugenics people expect to abolish them in a few generations through the agency of intelligence tests merely, concerning the efficiency of which there is much controversy even among themselves? In view of the fact that some authorities estimate (probably with some exaggeration) that one to three per cent of the present population show feeble-mindedness,[2] and that seven to ten per cent carry it as a recessive trait,[3] it would seem remarkable at least that the natural selection process among primitive peoples was not more effective, if indeed it has such a power of elimination.

It is difficult also to understand how such traits as criminality, alcoholism, "instinctive lying," and the like, could have survived in the heredity if we assume that they were unfavorable to survival on a natural selection basis. Of course, it

[1] *Sex*, 146.

[2] One prominent sociologist is said to place the proportion at 25 per cent, as an argument against the possibility of democracy.

[3] East and Guyer are among those responsible for this estimate.

may be denied that such traits were unfavorable to survival. It may be contended with Lombroso [1] that primitive society differed so markedly from our society that what is abnormal among us was normal among our distant ancestors. Thus he explained criminality as, in part, an atavistic or primitive survival trait in heredity, bringing the organism into conflict with a changed environment.[2] Holding that the criminal is born insane and epileptic, he speaks of him as a born criminal.[3] But it is difficult to conceive of any surviving social organization among primitive peoples in which epilepsy and insanity, murder and theft, could have been normal, especially if these latter traits were permitted to be exercised upon members of their own group. And how would such an instinct, as instinct (as distinguished from a reasoned or acquired trait), be able to distinguish between friends or kindred? If we assume a special instinct which prompts to the murder of a person with another language or with other customs, we overstep even the generous limitations to instinct prescribed by the uncritical biologists, because we include in its structure obviously learned traits. Finally, is not the assumption of a primitive environment which makes these traits normal among early peoples, and of another environment which renders them abnormal among us, gratuitous from the standpoint of the instinctivist? Does not a thoroughgoing theory of the instinctive origin of character assume that man creates his environment after the pattern of his instincts, rather than that the environment enforces its own code of morality upon man because of its survival value? The latter view is nothing short of environmental determina-

[1] *Crime, Its Cause and Repression*, 107.

[2] It must be remembered that Lombroso knew only the older theories of heredity which were quite vague in regard to hypotheses covering the mechanics of inheritance. His death occurred before the Mendelian theory became generally known and his theories were published before Weismann had brought out his data controverting the Lamarckian and Darwinian views on hereditary transmission.

[3] Lombroso, *op. cit.*, 144.

tion. Lombroso's theory must be repugnant to the instinctivist, because it makes no provision for an internal explanation of the changes in environment.

Since admittedly, in modern society, we have these unfavorable traits, such as criminality, drug addiction, lying, dishonesty, organized on an acquired basis, and since primitive people probably also possessed them on the same basis, it may be asked, Why, therefore, could they not have existed and still continue to exist on an instinctive or inherited basis quite as well? Why, in other words, is it not as easy for an adverse instinct to survive as for an adverse habit or custom (the social analogue of instinct) to be handed down from generation to generation? Each should have an identical effect upon survival—upon the survival of the individual, as well as upon the survival of the group. The difference in the chances of survival of the acquired and of the inherited dispositions rests upon the differences in methods of transmission, once it is granted that either may survive without extirpating the group or the race. The instinct is limited in its spread by the Mendelian ratio, while the learned disposition is limited only by the chances of contact. Herein is a great difference with respect to transmissibility. The hereditary content in the case of an instinct which is hurtful either directly to the individual, or indirectly to the individual because of its adverse effect upon the group, tends constantly to be depleted through the total destruction of defective germ plasm when the bearer is eliminated. If it is sufficiently hurtful it should in the end approximate entire elimination, because of the multiplication of those who possess the normal inheritance at the expense of those who suffer from the abnormal inheritance. But there is no such marked repression of acquired traits. If they are pleasant to the individual, or if they are overwhelmingly present in his environment (as is sometimes the case with disease

germs), he tends to acquire them regardless of the limitations of the inheritance ratio. All he requires is a model for imitation, or a source of contact and infection on the biological side. While the carrier of the unfavorable acquired trait tends also to be eliminated in the same direct ways as the carrier of the unfavorable instinctive trait, his chances of spreading the habit or the infection are vastly multiplied, because he is not limited by breeding age nor by the necessity of going through a complicated and time-consuming biological process in its transmission, in which only a definite proportion of the offspring bear the trait, and in which generations rather than frequency of contacts set the time limits upon transmission. The only requirement is that the trait acquired be not so destructive that it causes the elimination of the group as a whole, or so repugnant to the individual that he avoids it entirely, where he can exercise a choice. The difference in ease of transmission can be illustrated by the fact that an environmentally propagated idea may take possession of the world in a few years, or in less time, if it makes a sufficiently strong appeal, while an inherited trait could be generalized to the world as a whole only after numerous generations of carefully controlled breeding. Indirectly the chances of elimination are not as great for the acquired trait, because, since the trait is more likely to be widespread or universal when acquired, its possessor is not discriminated against in the survival and breeding processes to the extent relatively to which he would be if only a few or a fraction of individuals possessed it through inheritance. Even a germ disease might conceivably, in the absence of sanitary precautions, spread throughout the world in one generation. But it would require an almost measureless length of time for the whole world to become the possessor of a mutation through hereditary selection, at least under the traditional limitations upon breeding contacts which now obtain.

In the early history of man, before he had developed scien-

tific or experience tests by means of which to recognize and weed out unfavorable practices which spread as habits, the whole social fabric might easily become infected with vices and abnormalities of a character clearly preventable under a scientific régime. We are just now coming to recognize the evil effects of many vices, such as drug addiction, and to suppress them at a rate which could not be approached with the present degree of completeness on the basis of blind survival selection, if they were inherited, and by no means equaled, if they were combated on the basis of controlled breeding or conscious negative eugenics—a method which it would not have been possible to use in primitive society. But primitive man had no scientific tests, and consequently did not suppress the learned or acquired evils on that basis. Such evils were eliminated only in so far as nature tended to suppress those traits which destroyed the possessor, and even with this method there was constant danger lest the ease with which they were environmentally transmitted would win out against the slow method which nature had at her disposal in eliminating them. If the whole group were eliminated as a result of the moral or germinal infection of its members, nature won a larger victory. But even here she ran a risk of defeat due to the fact that the competitive group (where such a group was the immediate means of the elimination) might become infected by contact. On the other hand, whether the unfavorable instinct would be perpetuated would also depend upon the comparative rates of natural increase (Mendelian) and elimination (mass rates, where the whole group was eliminated through social struggle), but the advantage would obviously be with nature, either indirectly or directly, because she would have the Mendelian ratio for her as well as against her. We may conclude, therefore, that the chances of survival of an inherited trait which was harmful directly to the individual, or indirectly to the individual through its injury to the group,

would be small, at least over long periods of time, such as are involved in the history of the human race, because of the disadvantage under which it would place the individuals possessing it, in competition for breeding and survival to breed. On the other hand, the chances of a total elimination of acquired dispositions would be much less, owing to the method of their transmission through social mutation or lateral mass contacts, by means of which all members of the group would tend to acquire the trait.

But there is also a great body of dispositions and habits which may easily be learned from original experience, such as drug addiction or war, head hunting, etc., or acquired from catastrophic contact, without depending on transmission through social mutation or serial infection (as is often the case with germ disease). The chances of eradication of these traits, however unfavorable to the individual or the race—provided only they do not destroy the group—is negligible before the society reaches such a stage of development that it is able to exercise a successful social control based on a scientific demonstration of the relation of technique to the consequences for the suppression of such practices.

In the light of these facts it would seem that, other things being equal, the weight of presumption would be with the hypothesis that a trait harmful to society or the individual, coming down through long reaches of time, was acquired—either through imitation or serial infection on the one hand or original experience or contact on the other—rather than inherited. This assumption should stand until the technique of inheritance of the trait or traits in question has been worked out in any particular case under discussion and until there is evidence that the Mendelian ratio is fulfilled in the transmission. There are now no well tested instances in which any of these complex or general "instincts" have been shown to fulfill definitely the Mendelian ratio. Nor, as has been shown in

the preceding chapters, has any possible technique of inheritance been found for them. Even in the case of the supposed inheritance of feeble-mindness the Mendelian ratio is only approximated.[1] In the case of most of the supposed instincts listed in earlier chapters there has been no attempt to test their genuineness by the Mendelian ratio, while in other cases, especially in certain types of diseases, some feeble attempts have been made.[2] Nothing perhaps could constitute stronger evidence of the limited extent to which the Mendelian hypothesis has really entered into the critical revision of the biological thinking of our time than this failure to make the most obvious of all technical tests of the genuineness of reputed instincts, by examining the ratios of their occurrence and finding an explanation for their technique of transmission.

Others, who perhaps would not maintain that destructive instincts could survive continuously over a long period of racial history, might still seek to maintain the instinctive character of complex attitudes or dispositions on the ground that they represent recent mutations which have not yet been eliminated by the selective process or which tend constantly to recur, or finally, which are particularly fostered by our paternalistic society with its charity systems and sympathy for the weak. It is, of course, well known that mutations do occur in biological traits, and this hypothesis may appear to some to be quite a plausible explanation of the origin of instincts, good and bad. Of course, those instincts which are favorable to the individual and at the same time useful to the race can be explained on the ground of selective survival. The methods of testing their genuineness have already been discussed in the chapters immediately preceding. Here, how-

[1] See, for instance, the family charts in H. H. Goddard, *The Kallikak Family* and *Feeble-Mindedness*.

[2] See C. B. Davenport, *Heredity and Relation to Eugenics* and H. H. Goddard, *Feeble-Mindedness*.

ever, we may confine ourselves to a brief examination of the probability of unfavorable instincts arising by a process of mutation. Those mutations which are known to have occurred are, so far as we have definite record, relatively simple biological structures or mere compounds or duplications of other complex structures which already exist and are, therefore, after all very simple structural or chemical modifications. Wherever we have entirely new social, moral, and intellectual attitudes appearing as mutations, their biological character is purely a matter of assumption, not something which has been verified. In addition to this negative evidence against the instinctive nature of complex social traits which are new, we may bring forward other facts which will serve to throw some light, at least, upon the question of the probability of social traits being biological mutations. One of these is the fact that radical changes in structure and functions occur with greatly diminished frequency as the type grows in complexity.

Marked mutations apparently occur with some considerable ease among lower forms where the structure is simple and easily modified. Here also functionings of great significance may more easily be transformed without incurring the danger of destroying the organism by the creation of some fatal internal maladjustment. As long as the structures and functions are relatively simple the problem of a successfully coördinated readjustment of all the constituent parts and of their coadjustment as a unit to the environment is not so very great, and it may occur with relative frequency. But as the factors requiring coördinated readjustment multiply, the chances of a successful combination by mutation which will square with the environmental demands decrease by a radical mathematical ratio. The result is that such a complicated mutation rarely, if ever, happens. In an animal so complex as man the chances of its occurring, even in his physical structure, are almost or quite negligible, as judged from purely temporal

standards. The likelihood of such highly organized mutations occurring biologically in the neural structures correlated with the highly complex and variable abstract mental, moral and social traits and qualities, which are not merely chemical and physical and therefore not directly modifiable in chemical and physical ways, is even smaller. Yet, if we use this mutation theory as a basis for the explanation of the origin of instincts, the assumption would be that such mutational instincts are constantly coming into existence.

It may be argued, however, that there would be no such marked difficulties in the way of correlating neural processes successfully in the inheritance of a biological mutation, since presumably marked changes can go on in the neural structure without affecting the essential correlation of the vital or vegetative processes of the organism. In fact, through learning we do produce just such modifications of structure and functions as result in habits which are mistaken for instincts. Both these facts may be admitted without affecting our contention of the improbability of complex instincts arising by mutation. We do produce such modifications on the basis of habit and they occur without harm to the organism as a whole, except in so far as the character of the adjustments implied in the organization of the activity or value complex is injurious. The real difficulty in explaining the organization of complex instincts on the basis of "spontaneous" or "accidental" mutational variations is one of accounting for so complex and, at the same time, so definitely adapted a series of activities or values purely on the basis of chance. It is scarcely within the limits of probability to suppose that it could occur, at least with any considerable degree of frequency. The acquisition of such a neural complex, through spontaneous mutation, by a large number of people, would involve a combination of traits, the uniqueness of which can best be illustrated by the statistical occurrence of, say, a certain combination of dice

several hundreds or thousands of times in succession. An instinct to murder, or to tell the truth or to be proficient in chemistry, if it is really what it purports to be, instead of being some simple basic neural or anatomical structure or physiological condition which facilitates the acquisition of these dispositions as habits, would have in it several thousand, possibly in some cases several millions, of neural dispositions. All of these would have to be connected in the right order and proportion, otherwise the complex would not function effectively; it would be a mental aberration rather than a compact system of logical adjustments. It is the problem of linking all these neural processes together in the correct system which is as difficult and as exceptional as that of throwing the seven or eleven tens of thousands of times in succession. Perhaps a better analogy would be found in the assumption of having ten thousand or one hundred thousand sets of dice thrown at once and having the same number come up in each set. It is such a miracle as this which would have to be performed if a very complex social valuation or disposition appeared as an instinct through chance mutation. It might conceivably occur, but it would be so remarkable that we would not be justified in assuming its occurrence very frequently. Its improbability should also cause us to look sharply for hereditary connection between those who possess the trait before we assumed its inheritance. But if it should occur occasionally, certainly we should not expect it to appear simultaneously in a vast number of people.

On the other hand, the chance element is eliminated from the process of organization of the activity complex on the basis of learning. Here the dice are loaded. The adjustment complex is not accidental, but is the result of a long series of definite responses to definitely organized stimuli, mainly on the basis of previous experience. Many of these habits require years for their building and they are based on a vast

number of previously acquired habits which predispose in this new direction. They bear an orderly and causal development in response to a complexly organized environmental situation, of which they are the functional counterpart, rather than being derived from chance or accidental variations. The whole social and physical environment—its institutions, its myriad forms of communicative technique, such as language, ideas, systems of thought, science itself, tradition, custom, convention, even the structure of the physical world which surrounds us and largely molds us—is definitely organized so as effectively to impress upon the consciousness or the subconscious neural dispositions the particular valuational or habitual set which constitutes the acquired set. There is no chance for accidental occurrence. The cause is organized and it corresponds, at least symbolically, to the traits produced in the neural organization. In this respect the environmental production of complex traits has a tremendous advantage over their production through inheritance. In the latter case they must occur through changes in the germ plasm, and, as has been shown in a previous chapter,[1] the environmental cause of a biological mutation through inheritance bears no discernible similarity to either the chromosomal or the somatic result. That is why such variations and mutations seem accidental from the standpoint of their functions—the standpoint from which we most easily view them. They are selected for perpetuation through inheritance on the basis of their value as aids to the survival or breeding of the possessors. The relationship between the cause and the character of the trait is not superficially discernible, nor is the survival in any way directly related to the cause. But in the case of directly induced environmentally caused traits not only do cause and effect bear a visible relationship through similarity, but the generating cause of the trait is also the selective cause of sur-

[1] Chap. XI.

vival, for both causes are one and the same, the environment acting as an organized whole.

Some writers insist that the number of instincts increases with the development of complexity of the type. This contention is, of course, based on an assumption, whether consciously held or otherwise, that new instincts are constantly arising by mutation to meet the increased needs of the organism, and are then fixed in the type by adaptive selection.[1] The method of reasoning employed by those who make this contention for the multiplication of instincts according to the complexity of adjustments required of the organism is good up to a certain point. Apparently it is based solely upon the observed fact that the higher types of organisms, structurally and functionally considered, have a larger number of automatisms and near-automatisms. This we should expect, whatever the origin—instinctive or habitual—of these automatisms. The larger the number of adjustments to be made the greater the volume of adjustment technique which will be demanded. But such automatisms are not necessarily instinctive. In fact, experience teaches us that usually they are learned. The only basis which the instinctivist ordinarily has for regarding them as inherited is the fact that they act relatively so unerringly and with so little demand upon consciousness and often that they are so nearly universal in the population. We have already pointed out that formerly it was naïvely assumed that automatisms, especially those common to both parents and children, were inherited. It is still a common practice for those unfamiliar with the phenomena of inheritance, especially litterateurs and publicists in general, to speak undiscriminatingly of all automatisms as instincts.

[1] Apropos of the discussion earlier in this chapter, it would appear that the assumed power of the survival value of an instinct to select itself into the organism would also argue for the assumption that instincts unfavorable to survival would be eliminated by an analogous process of selection.

It requires but a slight amount of reflection and experience to convince one's self of the frequency with which automatisms are built up on the basis of habit. Detectives and other close students of human nature learn to classify people occupationally and in other relations of life by observing the habits they necessarily form in those relationships and which crop out unconsciously in their everyday activities. If the source of such automatisms were inheritance, instead of environmental pressures, we should scarcely expect to find each trade, profession, hobby and the like, so definitely characterized by automatisms peculiar to those who follow it. Of course the extreme instinctivist may maintain that the inherited structures and functions—techniques or automatisms—determine the trade or profession rather than that the adjustment demands of the latter determine the former. This contention, however, cannot be taken seriously by one who understands how trades and professions grow up and especially how their technic processes are continually being transformed with the appearance of new inventions and how the operative personnel shifts almost from day to day, and not according to inheritance lines. How absurd it would be to contend, for instance, that the reason why we have people following the trade of weaving is because these people were born with weaving instincts. On the basis of the same method of arguing we should have to suppose that we have more weavers to-day than formerly because the survival value of weaving has caused the natural selection for survival of those who have the weaving instinct. Likewise we should be compelled, if we were logical, to attribute the change from hand looms to power looms, not to the industrial revolution, but to a marked mutation in the form of the weaving instinct, which made it impossible to satisfy this instinct without changing the type of the loom. But this is not the limit of absurdity to which a logical adherence to the instinct theory in this connection would lead us. It would

force us to assume a form of mutation which not even the more sanguine biologists would sanction. The normal method by which mutations become generalized is for one, or at most a few, mutants to propagate the trait on the basis of competitive selection through inheritance. But here we have almost the whole weaving population coming into possession of the mutation at once, without the chance for competitive selection through inheritance. Thus the absurdity of supposing that occupational or other complex social adjustments develop in response to instinctive rather than environmental demands is sufficiently manifest. By way of corollary it also becomes apparent that the major source of the higher adjustment automatisms is that of environmental pressure rather than instinct or inheritance.

What is in effect a contention very similar to this—that many new and especially adapted instincts are constantly appearing by mutation in the higher and more complex forms of animal life—is the widespread belief in the inheritance of special abilities. The Whethams make what would appear to be unusually extreme claims for such inheritance. "We have seen reason to believe that the evolutionary meaning of the class divisions, which appear among all civilized and semi-civilized nations, is to be sought in the greater efficiency those divisions give in the performance of the many and varied functions of a civilized state. In a blind, rudimentary and imperfect way, successful nations have bred different qualities into different sections of their people, just as they have, to a clearer extent, into the different species of their domestic animals; and, since children tend inevitably on the average to inherit their parents' aptitudes, since sons frequently follow their fathers' professions and avail themselves of the advantages of the family environment, this segregation of qualities makes for efficiency, by adjusting the inborn characters of each man

to the work which will lie ready to his hand. Once the process has started either in man or beast, we are in a fair way to build up the class distinctions which seem to some people, where man is concerned, the height of stupidity, prejudice and injustice, and, in the animal world, a triumph of foresight and human intelligence. Thus the laboring classes gradually appropriate a large share of physical strength and endurance, and the instinctive skill in manual work which so often excites our admiration. Thus the clerk inherits assiduity and accuracy, and the honesty without which other clerkly qualities are as nought. Thus the manufacturer's son is born with the power of managing the complicated system of his mill, and of foreseeing the combinations and other factors which control the markets for his goods. Thus the soldier possesses the instinct of self-sacrifice, the power of commanding men, with that quick insight and decision in a dark situation which are necessary for success in the 'fog of war.' Thus the old governing classes of England, as of other similar nations, incorporate an instinctive sense of public duty and acquire a large share of the national aptitude for administration." [1] They add: "The arts of the demagogue, who possesses the power of influencing the masses, are also highly specialized qualities, and will be inherited directly from father to son. In America, where there are no classes, no differences of rank and all men are born equal—hypothetically at least—the 'boss' is already a well-recognized variety, with special characteristics of his own. These characteristics are said to consist of enormous powers of physical endurance, vast supplies of nervous energy, great organizing capacity and a phenomenal 'jaw' development. The power of passing examinations, which has been humorously described as a low form of cunning, has also been shown to descend from father to son." [2]

[1] W. C. D. and C. D. Whetham, *Heredity and Society*, 146–7.
[2] *Ibid.*, 149.

According to the above description the American "boss" must indeed possess a combination of traits which render him a veritable superman—a potential soldier, statesman, thinking genius and ideal popular leader—for he possesses the ground traits of all these. But alas! how unlike the real American "boss" this glowing picture is. It describes him only in organizing ability. In other respects there is no general rule for the American "boss." It will be observed that most of the special abilities mentioned above are highly complex combinations of traits, the patterns of which are to be found only in recent times. It is difficult to understand how they could be passed down from father to son, except on the hypothesis either of the inheritance of acquired characters or of the wholesale mutation of complex characters by inheritance in one specific direction. The unlikelihood, if not the impossibility, of the latter assumption being correct has already been made clear. Is it not the more reasonable assumption that these combinations of traits are found in line of descent more often than otherwise, but not exclusively, because favorable environments also run in the same channels, rather than through biological heredity?

Most writers do not go as far as the Whethams, although the uncritical popular view is at least as conventional and extreme on this point. The illustrations of the inheritance of special abilities which are probably most frequently cited for purposes of argumentation are those of music and mathematics. Here we find a number of rather remarkable instances of great ability in both parents and children. For example, it is said that there were seventeen musicians and composers of note in the Bach family. Curiously enough the appearance of mathematical prodigies is attributed to heredity, although evidence has not been adduced to show that such prodigies usually make their appearance by families. Many who have had highly developed special abilities have lacked a high degree of

general intelligence. S. J. Holmes says, "Blind Tom who possessed a phenomenal aptitude for playing any piece of music he may have heard was practically an imbecile. Often these 'idiots savants' possess remarkable memory, as in the case of the boy described by Langdon Down, who could repeat verbatim pages from a book that he had once read. Some of the mathematical prodigies are otherwise mentally defective. Heron reports a boy, nearly an idiot, who when given a man's age could calculate quickly the number of minutes he had lived. Another boy could multiply any three figures with any three others almost as rapidly as they were written, although he was of a very low grade of mentality." [1] It might be argued that with such low grades of intelligence such special abilities could not be acquired. But where memory is the basis of the performance such a conclusion by no means necessarily follows from the facts, when all of these are known. Apparently all details which the senses will record remain in the neural organization subject to recall and those who are accustomed to deal with hystericals, or even with normal people through hypnotism, find it possible to reproduce events or observations in the minutest detail.[2]

Woodworth says that there are tests for some of the special aptitudes, such as color sense and color matching, musical ability, ability in drawing and the like, but that we have no satisfactory lists of these special aptitudes. "They come to light when we compare one individual with another, or one species with another." [3] Thus "man is far superior in dealing with numbers and also with tools and mechanical things. He is superior in speech, in sense of rhythm, in sense of humor, in sense of pathos," but other animals are superior in other ways.[4] Individuals differ in these respects with each other.

[1] *The Trend of the Race*, 29.
[2] A. A. Brill, *Fundamental Conceptions of Psychoanalysis*, 20, 181 ff.
[3] *Psychology*, 288.
[4] *Ibid.*, 289.

But are these differences in special aptitudes inherited? What light does the question of localization of these abilities in the brain or the rest of the organism throw upon the question of their inheritance, or non-inheritance? We have seen in a previous chapter that instincts have not yet been localized in the brain. Herrick says that special abilities cannot be localized either: "Neurologists have been prone, even up to the present time, to fall into the error of attempting to find specific centers for particular mental functions or faculties. But the evidence at present available gives small promise of success in the search for such centers.[1] . . . No cortical area can properly be described as the exclusive center of a particular function. Such 'centers' are merely nodal points in an exceedingly complex system of neurons which must act as a whole in order to perform any function whatsoever." [2] For localization he substitutes correlation as the method of organizing special abilities.

Others, however, do not agree with Herrick in denying the localization of special abilities. Woodworth says, "There is some likelihood that the special aptitudes are related to special parts of the cortex, though it must be admitted that few aptitudes have as yet been localized." [3] Paton, however, is more enthusiastic. He says, "The study of special functions in relation to structure informs us of many recorded cases in which great activity along certain lines has been undoubtedly accompanied by very marked development of the frontal lobes. The brains of Gauss and Oliver, both distinguished mathematicians, revealed these characteristics in a high degree. The unusual command of language so preëminently characteristic of great orators (Gambetta) is accompanied by a prominence and complexity of both convolutions and fissures in the pars operculum and in a part of the third left frontal convolution, an area within which many of the mnemic repre-

[1] *Introduction to Neurology*, 2d ed., 324. [2] *Ibid.*, 332. [3] *Op. cit.*, 293.

sentations connected with speech movements are associated. Other parts of the brain, particularly those in the neighborhood of the interparietal fissure and the angular gyrus, have been found to indicate unusual complexity of structure in the cerebra of those endowed with great intellectual activity. In the brains of great artists, either musicians or painters, evidences of special development of certain cortical areas have been noted more often than among other types of genius. Bach's skull, for instance, showed unusual prominence of the portions of the brain about the supra-marginal convolution, and very possibly we should have found in the case of Beethoven and Von Bülow an uncommon degree of development of the acoustic centers in the temporal region. This same area is doubtless unusually differentiated in all great musicians. In the case of painters the visual center and the contiguous portion of the brain become of greater importance, comparatively speaking, than the auditory area; thus Raphael's skull is said by Mingazzini to have shown that those parts of the cortex in which the optic memories are stored were more prominent than ordinarily." [1]

However, this evidence from Paton, even if it be generally accepted, is not conclusive as to the inheritance of special abilities. We may grant that the brain structures connected with the abilities, as well as such external body structures as hands and vocal cords and eyes, are inherited, but these may be only the ground work upon which the abilities are developed. And it is also barely possible that the greater development of certain parts of the brain is due to the growth and extension of neurons in these regions because associations have become multiplied in these regions of the cortex through use, especially in the earlier years of development.[2]

[1] *Human Behavior*, 88–9.

[2] See C. J. Herrick, *op. cit.*, ch. 3, on the nature of the growth and extension of neurons; also E. L. Thorndike, *Original Nature of Man*, ch. 14; R. M. Woodworth, *op. cit.*, chs. 2 and 3.

Three very strong arguments, negative and positive, can be brought against the theory of the inheritance of complex special abilities as organized activity or expression units. The more economical and reasonable explanation would seem to be that these abilities, when found together in parents and offspring, are the result of association and imitation. It may also happen that they arise out of the same environmental conditions through learning without being copied from others, but it is to be expected that only the less complex activities would arise in this original way. When one stops to think that nothing could be more favorable to the acquisition of a characteristic than to live with a model constantly before the imitator and with all one's associates highly valuing that activity, it should not seem to be necessary to bring in inheritance as a substitute explanation. The inheritance explanation belongs to the days before the nature of environmental pressures and their relations to the learning process, including all the phenomena of suggestion imitation, were understood. It is often pointed out by the instinctivists that there is no regularity of dependence upon the transmission of the special ability, that it frequently does not show up in the offspring, assuming that if environmental pressures were the source it would invariably repeat itself in the children. They neglect two facts of importance in this connection. One is that on the assumption of transmission by inheritance the trait should appear in a certain definite ratio, which it does not. The other neglected fact is that environmental pressures are not necessarily uniform. It should also be noted that special abilities most frequently repeat themselves in families when those abilities are most outstanding or obvious to the senses and make a strong appeal to the emotional life. This is particularly true of music, which constantly obtrudes itself upon the attention and creates about itself an artistic and fashionable, or emotional, cult with values of an exceedingly dogmatic sort. On the other

hand the work of the scientist is relatively unobtrusive and makes but slight environmental appeal or pressure of an obvious sort. The environmental concommitants of these two abilities are therefore very different, just as the record of occurrence by families is different.

There is another negative difficulty in the way of the assumption of the inheritance of these special abilities, the principle of which has already been discussed in earlier pages. All of these abilities correspond, on their objective sides, to technic processes of performance which are distinctly modern. Art, literature, music, amusement activities, of the more comlicated kinds, are all historic inventions. Furthermore, each particular class of these technic processes came into existence rather suddenly, as compared with previous and subsequent history in the same fields. The first generations of those skilled in the new arts must have received their skill as biological mutations or else have acquired it. The difficulty of making this assumption of wholesale or multiple mutation has already been indicated. If the possessors acquired it in the first instance it would not have been possible for their descendants to inherit it unless the inheritance of acquired characters is assumed to be possible. Furthermore, if we must assume the acquisition of the trait previous to inheritance, what gain in economy of thought is there in bringing in inheritance as a subsequent and supplementary method?

Yet it should not be denied that there is an inherited element in special abilities, as in every other type of complex activity. In the case of the ability to play the piano there are, for instance, certain underlying biological traits which greatly facilitate the acquisition of this highly complex ability. Some of these are to be found in the possession of long fingers, flexible wrists and hands and a keen power of pitch discrimination. These are absolute prerequisites to great achievement as a pianist and they are inherited. Yet one might easily possess

all these traits and never play the piano at all. These are but preliminaries which make easier the acquisition of the art, but the art itself must be learned after all, and it is learned primarily through imitation. Hence the tendency for musicians to multiply by families and by local and ethnic groups. Thus it is not necessary to assume that the human superiority in technic skills with tools, numbers and speech, referred to in the quotation from Woodworth presented above, is inherited as such. Men's skill with tools undoubtedly has depended in part upon the possession of hands and human brains with tendencies to random and reflex movements. Without these inherited aids he could not have developed such skills, but the development of these skills is directly in proportion to the accumulation of culture, which enables previous experience to be utilized and imitated in their development in the individual. Also one inherits vocal cords and a brain capable of making many combinations and some tendencies to random and simple reflex articulation. Out of this develops language, if the environment is properly organized and has a sufficient cultural content to serve as models for imitation. But language does not appear as the result of inheritance alone. All the evidence we have at the present time for the inheritance of special abilities as organized units, as instincts, is the fact that such abilities appear so suddenly—at least they appear to do so to the scientific investigator, who knows little or nothing of the history of the individual previous to the time he observed him—that it seems difficult or impossible to account for them on the basis of learning. Their appearance, however, does not correlate with the Mendelian ratio. Nor is enough known about prenatal organic environment, the effect of endocrine stimulation and the part played by suggestion and deception, especially with hystericals, to eliminate effectively the environmental factors as causative agents.

Another misconception which the instinctivists almost invariably entertain is that environment is a relatively simple and rigid thing. They underestimate the extreme complexity of any environmental situation which affords formative pressures. The simplicity of the inheritance factor may by comparison have had something to do with their view in this connection. A more probable explanation of the tendency to attribute too great simplicity to the environment is to be found in their lack of familiarity with the methods of environmental organization. The scientific study of the social environment is very recent. The sociologists and social workers began it in the nineteenth century, the educationists and economists took it up, and now the psychologists and even the biologists are entering into the prosecution of it.

To understand the complexity of environment it is only necessary to reflect upon the vast economic and intellectual interdependence of modern life.[1] There is scarcely a person left in the world who is not either directly or indirectly connected with the great channels of commerce and industry. Although one may not be conscious of it, the Peruvian Indian or the south sea islander, as well as the German artisan or the British trader, has had an appreciable influence upon the ordering of each one's life throughout the world. It may be, even, that he exerted at some critical moment, however indirectly and unconsciously, that determinative pressure which gave direction to a great interest or activity in the life of many individuals. A very small environmental factor, such as a chance word or a disconnected experience, may give direction to long trains of activity, but it is the relatively constant or sustained factors in the environment which thereafter hold the train of events in that course or channel. Determinative choices are

[1] A good elementary and general description of the aspects of this economic interdependence is to be found in certain chapters of Louis B. Post's *Social Service.*

often made on what seem, and perhaps are, largely incidental circumstances. But the fundamental conditions of environment or life mold us into what we are in performance and adaptation. If we learn to perceive the complexity and volume of the ever fluid, but never wholly unconnected and unorganized, environmental pressures we shall be better able to understand how they mold character and we shall be less prone to attribute all traits to inheritance.

A closely kindred misconception concerning instinct is to the effect that environments of the same time and place are identical. This assumption that a general time and place identity makes for an identity of environmental pressures is also due to the failure to realize the complexity and multiplicity of environmental factors operating upon people. Students and others often ask why brothers or sisters, having the same environment, should differ so in complex characteristics, if the differences are not matters of inheritance. The fact that two people have the same parents and have lived in the same home seems to these questioners complete proof of the identity of their environments. Such an uncritical view is, however, very misleading. Even a year's difference in age may have meant very different contacts with parents and especially with brothers and sisters and playmates, who after all are among the most important sources of early education. The first children are brought up by their parents while the subsequent ones are directed and trained by their parents *and* elder brothers and sisters. In this same year or in a number of intervening years the residence and community environments may have been changed, the health of the family impaired or improved, the economic conditions bettered or rendered worse, and other profound changes may have taken place. One child may have contracted a contagious disease which left it more delicate than the other for a period of years and even in the midst of the same environment as a whole a largely differ-

ent set of factors would be selected to operate upon it. Perhaps even more important as a factor causing variation of environmental pressures is the child's own agency in selection. The child develops preferences, perhaps as a result of some factor in the environment standing out rather prominently for it, which, through a slight difference in circumstances, failed to affect the other children at all. Thereafter its development becomes, in a measure at least, teleogical and along different lines and with different objectives from those of the other children. Thus, because of this difference in the selective element, the future environmental pressures for the two become increasingly divergent. The environment never operates as a whole upon any one. Its weight would be stupendous, crushing. It would suppress, instead of develop. People always of necessity react selectively to their environments. One of the selective factors is, of course, heredity, but we have already shown that this element is not necessarily, and in social matters is not likely to be, dominant. The selective factor is more likely to be one of environmental conformity, and this conformity may be to a chance stimulus or suggestion, or it may be to an organization of social pressures which makes the survival value of the activity response called forth transcendent.

This tendency toward excessive simplification of the concept of environment which we have described is relative to the failure of many eugenists to conceive of the possibility of social evolution solely on an environmental basis.[1] Many biologists who have followed carefully the evolution of phylloxera or seaweeds, or paleobotanists who know every type of fern which has entered into the making of the coal measures, know next to nothing of the evolution of the vast store of acquired mental technique. Biologists have neglected the study of man, and this neglect of the human animal has been most marked per-

[1] See the Whethams, for example.

haps on his psychical side. Indeed, this is why the sciences of psychology and sociology have arisen to compensate for this inattention. This neglect has continued largely because of the standardization of biological technique around the microscope and a highly simplified and elementary method of observation. Latterly the methods of complex observation through schedules and the utilization of statistics as a basis of generalization have been introduced into biology by the eugenists in response to stimuli from the social sciences.

Most, or all, of the eugenists have evolved by the way of biology, or at least they have seldom been social scientists. Therefore they are unable to give due emphasis to the environmental factors. Knowing little or nothing about the methods of operation of the higher mental technic processes developed through a process of environmental evolution,[1] they have fallen back to their knowledge of organic processes in the lower animal forms for the data upon which to build their methods. It is at this point that their highly simplified and elementary methods have failed them. It has been the boast of the biologist that his method is truly scientific, that because of it he is free from the gross exaggerations in generalization of which the social scientists are guilty.[2] Yet perhaps no more stupendous error in all modern science has been committed than that which the biologists must sooner or later acknowledge themselves guilty of in applying to man their theory of instincts worked out for lower forms. They have leaped the chasm between the lower forms, largely those in the *order* of insects or below, to the highest of the mammals on the wings of an analogy. Because man has shown himself to possess automatisms which superficially resemble those of the lower forms which are obviously instincts the biologist has,

[1] See Chapters V and VI; also "Neuro-Psychic Technique" in *Psy. Rev.*, Nov., 1923.

[2] See Bernard, "The Function of Generalization," *The Monist*, Oct., 1920.

without adequate investigation of the applicability of his principles to man, uncritically assumed that man's automatisms are also instincts. An extensive reading of the biological literature dealing with man has nowhere revealed a single biological analysis of man's activity as the basis for attributing instinct to him. All investigations of the inheritance of moral and social traits have been mere countings of coincidences of traits in parent and child or other near relatives. The evidence that these traits thus statistically tabulated are instincts does not anywhere go beyond the mere assumption that they are inherited. This is the biologist's peculiar and signal error in dealing with the inheritance factor in man. Knowing little else than instincts and tropisms from his study of the lower life forms, he imputes what he knows definitely of these lower forms also to man, the laws of whose mental life he does not know because he does not comprehend the nature of the psycho-social milieu in which man lives, acts and thinks.

To be sure there are some signs in the recent literature[1] that the biologists are waking up to their colossal error. Their scorn of the methods of the social scientists has at last produced a back flow of reflection which threatens to be enlightening to the biologists themselves. It is the fashion now for the biologists to write about man, since a strong popular demand has grown up for more knowledge regarding the dominant member of the animal kingdom, and we may hope that the biologists will begin to study and interpret him directly instead of by analogy, and in all his relations, including the social, as well as in his merely biological functions; and with statistics as well as with a microscope.[2]

[1] For example, Professor W. C. Curtis, in his admirable volume entitled *Science and Human Affairs*, does not once make use of the term instinct, although he uses biological illustrations almost exclusively. The biologist H. W. Conn also perceived the inadequacy of the inheritance explanation. See his *Social Heredity and Social Evolution*.

[2] S. J. Holmes has made such a beginning in *The Trend of the Race*.

The development of the higher mental technic processes, which we have discussed in earlier chapters, as a means to an efficient adjustment to an increasingly complex environment, has made possible and imperative a new type of evolution. The earliest evolution was possible only in so far as new instincts could be produced to meet the adjustment demands of new environmental pressures. With the development of non-instinctive organic and mental technic processes or mechanisms, adjustments began to be made on an environmental basis to supplement those based on instinct. Man, especially the most highly civilized or cultivated man, now makes his most important adjustments on this learned or environmentally controlled basis. He probably retains as many instincts as the lower animals possess, at least in rudimentary forms.[1] There is, however, no good evidence that he possesses a larger number of instincts than the lower animals or instincts as completely integrated as they. His life has so far outgrown his instincts that it has become necessary for his activities to be organized externally or environmentally instead of internally and instinctively. In this external and environmental organization the most diverse inherited traits are combined into new relationships to serve social or environmental demands. In this way an ever-expanding environment calls forth an organization of serial responses, analogous, but superior, to those made on the basis of instinct. This is evolution on the basis of environmental pressures, that is, on the basis of social selection. It is social evolution as distinguished from biological evolution.[2]

[1] We have already suggested the possibility that man has been selected in his heredity away from his earlier instinctive adjustments to meet new environmentally imposed survival values, with the result that some of his instincts have been disintegrated or destroyed. This is especially to be observed in connection with the prolongation of infancy.

[2] See Conn, *op. cit.*, ch. 11; also a somewhat more speculative work by C. A. Herter entitled *Biological Aspects of Human Problems.*

One further group of misconceptions of the instinctivists may be examined briefly. The first of this group has its source in the distortion of biological thinking about man, due to the fact that the biologists have applied their conclusions, drawn from the study of lower forms, to man by means of analogy. This misconception might be called the atomic theory of human conduct. The instinctivists have too often given cause to suspect that they think of man's activities as combinations of inherited units—instincts and reflexes—which are bundled together by some mysterious teleological force, the concept of the end, or possibly even by an adaptation or striving for the end inherent within the instinctive processes themselves. It is beginning to be clear to us, however, that the organism acts largely as a whole, and not as a more or less loosely assembled bundle of separate activity units. The early or atomic theory of instinct dominance has held that the instincts appeared separately and largely independently of the larger unity of the organism and then organized the activity of the organism to conform to their separate and individual ends or conations, making compromises of jurisdiction where conflicts arose. There may be some justification for this view when applied to the lower animals, especially the insects and the worms and many of the sea animals, which are still in the dominantly segmented stage of development.[1] Such animals develop and function more nearly on the basis of the "federal principle," to borrow an apt expression from the social sciences. In a sense we may even suspect that instinct is very closely correlated with segmental functioning. We find it operative especially among the insects and the worms and the multitude of segmented sea animals, where each segment lives a life more or less self-sufficient and yields to the community interest only under a certain degree of compulsion, and perhaps haltingly.

[1] J. Loeb, *Comparative Physiology of the Brain and Comparative Psychology*, especially chs. 6–9.

Since there is no intelligent centralized control, it is of the greatest importance to the segmented animal that each segment should have an automatic mechanism adequate to its adjustment needs and which can be made to yield to the demands of the other segments when their conflicting needs for adjustment are even more insistent or crucial than its own.

But man, and in some measure the animals nearest to him, have developed elaborate central coördinating mechanisms in order that the organism as a whole may the more readily coöperate in the adjustment of all its parts to the environment. This correlating mechanism, the cerebral cortex, is in man the seat of a high degree of intelligence. The segmental character of the organism has been largely lost or overshadowed in the higher animals by the dominance of this central mechanism, but the vestiges of the early segmental arrangement clearly survive.[1] And with them also survive the vestiges of the instincts, the action-patterns or neural mechanisms for the autonomous control of the segments. But the closer union or merging of the segments into the more closely knit and more unified higher organism is also paralleled by the subjection of the rebel and individualistic instincts to the rule of the central mechanism or cortex, which in man is the seat of conscious control. This human cortex is essentially a clearing house for environmental pressures which impinge upon the unified organism in a larger number and in a greater variety of conflicting tendencies than can be cared for by the vestigial or fragmentary instincts, many of which have been selected out of their traditional or hereditary alignment and are therefore no longer able to mediate effective adjustments for the organism. Of course, some of the old segmental instincts still remain practically intact and are centered in the autonomic nervous system. The visceral instincts especially do not require cortical regulation, at least not in so great a

[1] *Ibid.*, ch. 9 ff.

degree as do those which serve in the newer functions of organic adjustment. However, they may and often do require that the environment shall not interfere with their automatic functioning, as in eating or breathing; or, on the other hand, the environment may demand that their functioning may be made to conform to social canons of propriety, as in eating and reproduction. In such cases, it becomes the business of the central thought or cortical mechanisms to superintend these adjustments or compromises with environment, not alone in the interests of the individual organism as a whole, but also in the interests of the social whole—a new entity of which the central coördinating thinking mechanism has become aware and which it has in large measure created.

It is largely because of this central conscious control mechanism that the organism does not act in parts, but adjusts to its environment as a whole. The higher animal organisms are much more closely tied together neurally than are the lower organisms, because the segments and the segmental neural organizations are more closely correlated and merged under the general supervisory direction of the great associatively functioning cortical ganglion. But the unity of the organism's functioning arises largely, and even primarily in man, because the environment early gets hold of the organization of the cerebral cortex and thus dominates the organization of the organism as a whole. Such domination by the environment—especially the psycho-social environment of institutions and programs—is rendered possible and is brought about through the superior functioning of man's brain through his senses, which enables him from the earliest years to form perceptions, and even concepts, of environmental objects and of his relationship to them. Very early in his life he has a picture of his environment and he generalizes about it. It takes hold of him, masters him, and molds him. This it does by seizing upon his random movements, definite reflexes and habits, and also

his vestigial and disintegrated instincts, organizing them into the action patterns and complexes and values which represent and correspond to the existing environmental organization. Thus man's internal neural complexes are organized as correlates of the environment, under the pressure of the environment, and consequently they reproduce and perpetuate this environment, subject to such modification as arises from the process of transference from environment to subjective neuropsychic complex and back again to environmental organization.

In the human animal in many cases the environment makes its demands upon the organism even before the segmental impulses or instincts and reflexes appear in full maturity. Thus from the beginning these reflexes and instincts grow into a form or organization of action patterns imposed from without. A great many of them, when they appear, find the organism already functioning as a unit and they are organized into this unit organization. Thus it may be said that the instincts and reflexes never function as entirely independent units, not even in the lower animals. And much less is this possible in man, who so early falls under the dominance of the cortical correlations, through which the environment is working and imposing its unity upon the organism, weaving each new instinctive action process into the environmentally dominated whole as it appears.

It is true that the newly born child does tend to be dominated by the anarchic segmental reflexes and instincts, at least at first. It does not readily correlate its organism as a whole. It has been said that the child is practically brainless at birth.[1] That is, the cortex has not yet begun its work of correlation and direction. The stimulus of the environment seems to be quite necessary before this wonderful cerebral correlating mechanism can work effectively, as when certain delayed inherited connections have to be made in the brain. But very

[1] S. Paton, *Human Behavior*, 133.

quickly the environment selects the responses and the complexes which constitute the cortical set, or sets, which correspond to the external environmental unity of organization. The result is that random tendencies and more or less separate and independent segmental processes lose their separateness and are fused into one great whole. Where this fusion is complete the organism adjusts as a whole, relatively without waste of time or energy, to the environmental demands. This result is the ideal end aimed at in education; also in a well controlled political and social life. But the unity comes essentially from the unity of the environment, rather than from any internal unity. Internal unity of structure does exist, especially under the dominance of the higher vertebrate brain, but in the very young child the instinctive impulses arise largely without the wider organic functional correlation, that is, as more or less disintegrated and vestigial segmental reflexes, which must be tied together and harmonized through the supervisory function of the cortex, which is so responsive to the environment because of its power of making perceptions and conceptions with reference to this environment.

Thus it becomes apparent that the fact that the organism acts as a whole, rather than through its separate or partial segmental instinctive action processes, turns the argument against the instinctivists. More recently they have advanced the same proposition in an endeavor to show that the instincts are not such minute and isolated action patterns as the early psychologists supposed, but that they involve and dominate the whole organism. The argument becomes a part of the inevitable tendency to expand the scope and generalize the content of the instincts. As it became apparent to the psychologists that man does not possess such definite inherited action patterns as the old atomic theory of the instincts held him to possess, they—with characteristic error—did not give

up the concept of instinct as the dominant factor in human action and the control of conduct, but retained the concept and expanded it to cover the facts of acquired complexes or habits. The environmentalist accepts the now obvious fact of the unity of the human organism and its responses, but maintains that such unity does not arise from very general and complex variable instincts—which we have shown to be misconceptions and impossibilities—but from habit complexes organized under the dominance of the environment and working through its great inner organ, the conscious mechanism of the cerebral cortex.

This more recent misconception, that the instincts are generalized activity tendencies involving the whole organism instead of merely a part or a segment of it, is closely related to the view that the instincts do not function perfectly when they appear, but that they have to be perfected through learning. The confusion here arises from the fact that the investigators failed to find the instinctive patterns functioning with mechanical exactness, as they had anticipated. Being unwilling to accept the obvious conclusion that the instincts are largely vestigial and disintegrated in the higher animals, especially in man, they modified instead their definition of instinct until it became a contradiction in its own terms of definition. They made it a habit in fact but still called it an instinct, which is an inherited mechanism. One writer says instincts are not perfect without learning, that no instincts (at least complex ones) function without training.[1] This line of definition and explanation of the nature and function of instinct is on the wrong tack. If instincts do not function without training they either are not instincts in the first place, or they appear only after the environment has already organized the responses of

[1] See Jas. L. Mursell, "The Ontogenetic Significance of Instinct, Habit, and Intelligence," *Psy. Rev.*, 29:166; see also C. A. Ellwood, *Sociology and Its Psychological Aspects*, 204; J. Dewey, *Human Nature and Conduct*, 107.

the organism into a unity which conflicts with them and modifies them. Perhaps the hypothetical instincts which have to be trained into perfection never were instincts, but are merely anthropomorphic creations imputed to inheritance; or they may be the fragments of disintegrated instincts, or original reflexes and random action tendencies, which are organized into sequential processes or chains and complexes by the environment. In any case, it is clear that the environment, and not instinct, is the dominant factor in giving unity and definition to the activity processes which are trained.

Finally, it must be clear that the concept of instinct as a teleological striving, as action toward an inherent end, is also a misconception.[1] Obviously this is merely a metaphysical statement of phenomena of adjustment viewed from an anthropocentric standpoint. It is of a kind with the theory of the *élan vital* of Bergson, which assumes that there is a life force which accounts for the adaptation of the organism to its environment, or with the theory of the inevitableness of progress which posits a mystical or metaphysical principle of progress as inherent in world relationships and social evolution. Instincts cannot be defined in terms of the "end" or functional value of the adjustment they mediate. As before said, they are concrete structural and biological facts. To define them in terms of their adjustment ends may give an illuminating anthropocentric statement of the social or individual value of the activity process, but it affords no basis on which to distinguish an inherited from an acquired activity process. Instincts and habits do not differ from each other either in the form of their structures or in their adjustment functions or values. They differ in one respect only, and that is their

[1] T. B. Veblen, *The Instinct of Workmanship*, 3–4, has stated this view forcibly. The passage in question is quoted in a footnote to Chap. XIV of this volume. W. B. Pillsbury, *The Fundamentals of Psychology*, 423 ff., takes a similar view of the teleological nature of instinct.

origin. But the question of origin comes to be of very great significance when we are considering the utilization of action content for the control of character formation.

Furthermore, the instinct cannot, as the metaphysicians of conduct would seem to imply, carry within itself either the consciousness or the determination of its end.[1] Instinct arises from, and is most characteristic of, the adjustment needs of the lowest animals. Here consciousness, in any organized perceptual or conceptual sense, does not exist. Instinct, as was shown in an earlier chapter, comes before reflective consciousness, perhaps before any but the very lowest forms of consciousness which consist of some elementary sensory and feeling elements. The biological selection of instincts for survival has been a purely blind process, so far as the conscious control of the individual selecting them is concerned. Such selection, depending as it does upon the value of the instincts for the promotion of the individual's survival, is a biological, not a social, process. Only social selection has been conscious, so far as the initiative of the individual directly affected, is concerned, and for the most part even social selection has been unconscious and blind. Biological selection through inheritance can be conscious and purposive only from the standpoint of the outsider who directs the breeding process or takes part in it, never from the standpoint of the one in whom the inheritance is consummated. The instinct itself, as has been shown, is a blind unconscious mechanism and comes into consciousness, either of itself or of its end, only when it is being modified into habit and is ceasing to be instinct.

Obviously, therefore, the conception of the end, in so far as an instinct is concerned, is one read into the adjustment process from the outside. It exists only in the consciousness of

[1] It is interesting to note that Loeb characterizes instinct as a metaphysical concept. See *Dynamics of Living Matter*, 5. Dewey (*op. cit.*) takes much the same view of the matter.

the onlooker or of the evaluator. It is an afterthought of the human mind, perceived by the philosopher, social or cosmic, who reads his anthropocentric or pancentric outlook into the phenomena he perceives and measures. Conscious orientation and control is possible only where there has already been synthesis in thought, that is, where unity and meaning have been read into the situation where adjustment is taking place. Instinct makes the adjustment without conscious direction, but when conscious control of adjustment becomes possible because of the development of evaluative and purposive thinking, instinct is evaluated along with other factors in the adjustment process and is assigned an adjustment significance or an objective and end. But that end is not inherent in the instinct, in the sense that it can exist apart from the consciousness of the outside thinker and evaluator. The concept of the end is an anthropomorphic and anthropocentric device for thinking. To define the instinct in terms of this imputed end is, therefore, to describe and evaluate a social situation or individual adjustment, but it does not describe or define a biological datum or distinguish it from a psycho-social fact.

CHAPTER XVIII

THE NATURE OF THE EMOTIONS

Along with the view of instinct which has been criticised in the preceding chapters has developed a theory of emotions which, in the main, is subject to the same general errors. It will not be possible to develop a scientific social psychology or psychology of character formation (whether this character formation takes place under the leadership of the schools, the church or some other formative institution) without first correcting the current biological errors concerning emotion. The instinctivist theory of emotion, like the corresponding theory of the instincts, has been unduly influenced and dominated by the biological tradition. It is the general belief that man inherits from the lower animals well-defined complex emotions to correspond to his supposedly complex instincts, or at least that he inherits a central core of emotion which corresponds to these so-called instincts and which in turn dominates the organization of the complex emotions and of the sentiments, which are complexes of emotions and feelings organized around an object or an idea of an object. The original emotional core is supposed to be inherited as a unitary and indivisible element in consciousness and is inseparable from the corresponding inherited action pattern.

A slightly different view holds that the emotion is the inherited complex and that the instinct or inherited action pattern is organized within the emotion, which is both consciousness and expression.[1] Some writers even go so far as to speak

[1] A. Shand, *The Foundations of Character*, 180 ff.

of the emotion as a substitute for the instincts, assuming, apparently, that action is the result primarily of consciousness and that the emotion is the primary directive factor or unit in consciousness and action.[1] The viewpoint of this chapter is that the term emotion belongs to consciousness rather than to overt action or expression. It is treated as a form or process of the mental life and therefore as a correlate of action or of inhibited action. In this respect it belongs to the same category as feeling and thinking. Feeling is a psychic correlate of the neural dispositions in action;[2] while thinking is the neuro-psychic counterpart or substitute for the interrupted or inhibited overt action. Emotion may be said to partake of both of these aspects of the mental, as well as to contain elementary organic sensory processes and complexes which may be classified as pre-intellectual or pre-recognitive. These last elements of emotion, the organic sensory ones, are primarily visceral, but they are also in a measure peripheral and kinæsthetic.

McDougall finds that there are seven of these elemental or primary inherited emotional units and that they correspond to what might be equally well described as seven primary instincts. They are as follows:[3]

The instinct of flight and the emotion of fear
The instinct of repulsion and the emotion of disgust
The instinct of curiosity and the emotion of wonder
The instinct of pugnacity and the emotion of anger
The instinct of self-abasement (or subjection) and the emotion of subjection (or negative self-feeling)
The instinct of self-assertion (or self-display) and the emotion of elation (or positive self-feeling)
The parental instinct and the tender emotion

[1] L. Perla, *What Is National Honor?* for example, apparently takes such a view in treating the psychology of public opinion.

[2] M. F. Meyer, "The Nervous Correlate of Pleasantness and Unpleasantness," *Psy. Rev.*, XV:307.

[3] W. McDougall, *Introduction to Social Psychology*, ch. 3.

Other instincts, such as reproduction, gregariousness, acquisition and construction, are lacking in well-defined emotional correlates, according to McDougall.[1] One might conclude that as the generality of the instinct activity increases so does the indefiniteness of the corresponding emotion become more marked, until in the case of such general "predispositions" as imitation, suggestion, play and sympathy, no recognizable emotional correlate whatever can be found.[2] This is indeed true.

However, in the very beginning, it is well to question the assumption that the emotions corresponding to McDougall's seven supposedly well-defined instincts are unitary and indivisible. Just as we have demonstrated in the preceding chapters that these so-called instincts are really complexes of instinctive and acquired action-patterns or of values, so shall we be able to show that the so-called primary or elemental emotions are complex organizations of feelings, organic and peripheral sensations and perceptions, even of concepts in the more extreme cases, and that they are as variable and as loosely organized in content as the activity or value complexes to which they correspond. By the same process of development we shall be able to show that the emotions are not inherited central consciousness correlates of the instincts, but that they arise only when the central portions of the neural action patterns are inhibited or modified or when some other organic or neural activity process is displaced by the particular activity with which the emotion is subjectively associated. The central segment of the action-pattern does not remain unchanged.[3] No part of the action-pattern is modified more readily than the central portion. The chances for the

[1] *Ibid.*
[2] *Ibid.*, ch. 4.
[3] For McDougall's affirmative claim, see *op. cit.*, Chap. II.

development of hyper-complexity in the central segment are numerous, when we consider that man possesses in his brain some nine or ten billions of neurones. If any portion of the stimulus-response mechanism could be called stable it should be the response mechanism. Most writers, including McDougall, name their instincts after the responses observed, and some writers claim that the chain of reflexes which constitutes the action-pattern and leads up to the typical response may vary without limit, according to environmental pressures, without destroying the unity of the instinct, so long as the response is uniform and unchanged.[1] However, it may be suspected that the unmodified response is also a myth, and not many students will agree that only one portion of the action-pattern shall be selected to represent the whole. Nor is it perfectly clear that some of the links in the chain of neural mechanisms which constitute the so-called instinct pattern are not learned or acquired. In fact, one of the results of this study which should now be apparent is that emotional consciousness is not indissolubly associated with the central segments of instinct mechanisms. Since emotions represent the inhibition or the modification of neural processes rather than constitute their conscious correlates, they occur as readily in connection with the interruption or modification of habits as of instincts. We may expect to find a habit association as readily as an inherited association with emotion.

The emotion, therefore, is not an original psychic element, but is a composite of other psychic elements. Unlike feeling, which is unilateral, it has two general dimensions. One of these dimensions is the feeling-tone constituent itself. Every emotion, so long as it remains an emotion, has a feeling quality. It is either pleasant or unpleasant, or it is both. The other dimension is that supplied to the emotional complex by sensations and their higher and more complexly organized permu-

[1] Smith and Guthrie, *General Psychology*, 54–67, may be cited as an instance.

tations. At its lowest levels the sensory element is largely organic and visceral. It may be quite vague and ill defined, but the visceral and organic emotions generally are powerful. Hence, when this primitive organic sensory element exists in the emotion the conscious expression is likely to be powerful although subjectively poorly defined. It is the peripheral sensory elements which best organize themselves into definite perceptions and ultimately into concepts, and these higher organizations of the sensory dimensions of emotion gives to it the recognitive element which characterizes the higher and more distinctively human forms of emotion. With the gradual increase of the recognitive element in the emotional complex the complexity and the variability of the emotional content approaches to infinity, at least in the human organism.

It will be necessary to make a more detailed statement of the nature of feeling and thought than was required in the preceding chapters before we can proceed effectively with our analysis and argument. Feeling is the earliest subjective or conscious evaluator of action, indicating the worth of the activity to the organism. It functions before the perceptions have been organized out of the sensory processes sufficiently well to enable the organism to guide its conduct in an intellectual way. Feeling is negative and relatively inefficient in its evaluations. On the other hand, rational or constructive thinking, organized on the basis of objective quantitative and standardized perceptions, is the latest and most efficient guide to the valuation of conduct. While it never wholly supersedes feeling as a guide, even in man, it tends constantly to usurp more of the function of judgment because it is more likely to be correct. Those who habitually make their decisions on the basis of feeling are called irrational and unwise and it is commonly expected that they will come to grief.

The sensory elements are doubtless as old as the feeling

processes, but sensation alone does not afford a valuable guide to conduct. Sensation appears to function primarily in locating the whereabouts of the environing situation or condition, internal or external, which the feelings sanction or disapprove, according as a tone of pleasantness or unpleasantness is experienced as an accompaniment of the activity. Thus the inner organic or visceral sensory disturbances accompany the non-functioning or wrong functioning of internal processes, those most commonly and most intimately connected with survival and health. To what extent these sensory disturbances guide the lower animals to remedial action, such as seeking relief by movement, biting at parts of the body when in pain, stimulating to defensive or offensive actions, etc., it is difficult to say, but they are probably not wholly epiphenomenal, even in the lower organisms. In the higher organisms they may be said to serve quite effectively as localizers, and in man they may lead to such sophisticated remedial measures as medicine, the surgeon's aid, the study of dietetics, and many more processes equally effective. The peripheral sensory elements lead to avoiding and approach reactions in the lower forms. In the higher animals, at any rate in man, the sensory processes are internally organized into percepts and concepts. These serve as the basis of all man's thinking, which normally is preparatory to overt adjustment. In the last analysis the sensory element has contributed much more to the guidance of the organism than the feeling element, although there probably was a stage in animal history, before definite perceptions and concepts had arisen out of the sensory elements, when the feeling processes were the better guides. One reason for this growing superiority of the sensory constructs over the feelings in guidance is that the possibilities of accurate measurement are so much greater in connection with the perception elements. There are as many possible tests as there are perceptions which can be organized from the

sensory process materials, and in the higher organisms this number is very great; in man it is practically infinite. The only ways of getting variety of valuation in feeling is through the two qualities or tones of feeling—pleasantness and unpleasantness—plus the degree of intensity with which each feeling tone operates, a total of four measures, two of them qualitative.

The perceptive elements become quantitative in their measuring technique, when applied to value judgments, not alone through intensity—which is not so definite and easily perceivable here as in feeling—but primarily through the development of quantitative symbolic measurements, made possible by the development of quantitative and definitive categories in perception which make possible close discrimination and comparison of values and relationships and consequences on the quantitative as well as on the qualitative side. That is, it is possible for man to control and extend his sensory perceptions by means of a mechanical control of his environment and to develop mechanical and external as well as internal or subjective methods of comparison and discrimination. This is especially possible with regard to the peripheral sensory elements, most especially in connection with the two higher exteroceptive senses, sight and hearing. It is also possible to a considerable extent with smell and taste and touch. But it is less possible in connection with the organic senses of the muscles and joints and very little possible in connection with the purely visceral sensory elements and complexes. Consequently, man develops an intellectual life and control in connection with the peripheral senses—most especially sight and hearing—but scarcely at all or not at all in connection with the organic and the inner or visceral senses. Likewise, his mental life and control growing out of his feelings are primarily qualitative and but little quantitative or intellectual. The essence of the intellectual aspect of consciousness is that it is

quantitative rather than qualitative and it is developed primarily or almost wholly in connection with the higher peripheral or exteroceptive senses, sight and hearing. The more internal the basis of consciousness the more primitive is its character, the more qualitative and the less intellectual and dependable as a discriminating guide.

The two qualities of feeling—pleasantness and unpleasantness—are correlated with two different types of modification of neural processes. As has been shown by M. F. Meyer, pleasant feeling tone is correlated with an increasing flow or synthesis of neural processes, while unpleasantness is correlated with the diminished flow or interruption of neural processes.[1] Thus, if one is eating and new dishes which are agreeable to the diner are brought in or if there is agreeable conversation, or if flowers are on a pleasantly laid table, or if soothing music is played, pleasure is increased. If all these factors are brought together at the same time the pleasure of dining may be very great indeed. But if the telephone rings, if some of the dishes are burned and if some one starts a disagreeable argument, or a book agent appears at the door, all in succession, one may give up the attempt to eat in despair. Or we may take an illustration wholly from the realm of mental correlations to supplement the one just taken from the organic realm. One may be engaged in studying a problem or in writing an article and new material of value to him comes to hand. The result is that the one concerned thinks out his problem more effectively and his pleasure is increased. But if some of his notes are destroyed or data are discovered which make his conclusions appear doubtful, his thinking becomes relatively ineffective and the whole of his consciousness will be overclouded with unpleasantness, until he turns to a new task or finds new material to support his train of thought. Thus we

[1] *Op. cit.* See also L. L. Bernard, *The Transition to an Objective Standard of Social Control*, ch. 2.

see that both feeling tones—pleasantness and unpleasantness—may accompany either organic or intellectual activity. Ordinarily, perhaps, the greater intensity is to be found in correlation with the organic processes, but this is not necessarily the case, as may readily be shown. Also we may observe that the feeling qualities appear in correlation with changing processes—increasing supplementation or disruption of or interference with synthetic processes—and therefore may be expected to be most intense and effective when the functioning is no longer by means of purely instinctive processes, but is in the nature of an interruption of them. However, the supplementation of and the interference with and disruption of neural processes may occur wholly with regard to instinctive processes which merge or conflict under the pressure of environment or sometimes from impulses from within. But rarely is this the case with man, at least cultured man, who has so many acquired elements in his action-pattern complexes, even from the earliest childhood. Even at its basis in action-patterns the experience of feeling, both in quantity and quality, is largely conditioned or controlled in man by environment, either acting directly through setting the conditions for supplementation of or interference with neural processes, or indirectly through building up acquired action-patterns which supplement or interrupt the instinctive pathways and other acquired action-patterns.

Although feeling has always been an insecure guide to value judgments, even in the relatively simple conditions of primitive human or animal life, it is especially uncertain in our complex society, when artificial factors and conditions have been developed in the environment. To a large extent, as we have seen, the psycho-social or institutional and organized cultural environment has replaced or supplemented the primitive natural or physical and biological environment. The artificial and non-instinctive elements in the environment of to-day are

not confined to the psycho-social milieu alone, for man has also in large degree transformed the physical and biological aspects of the environment, especially with respect to foods, power appliances, transportation, etc. In the matter of foods, for example, it is no longer possible safely to depend upon one's instincts or the feeling tones which arise in the gratification of the appetites. The rational or thinking adjustment is much more dependable, because of its greater objectivity and the methods of quantitative discrimination and measurement which have arisen in connection with the perceptive and conceptual processes. But even this rational process of objective measurement and discrimination has not been perfected and much still remains to be done before it can become wholly effective. The method of attaining this objective effectiveness is the method of science.

As before stated, emotion occupies an intermediate position between feeling and thinking as a method of evaluating an interrupted or modified adjustment. When the feeling dimension or aspect predominates in the emotion it is often mistaken for the feeling itself and frequently the language of description makes no verbal distinction between feeling and emotion. On the other hand, when the higher forms of the sensory element, the recognitive aspect as determined by percepts and concepts, are dominant, we are accustomed to speak of the whole as mixed thinking or as thought suffused with emotion. Perhaps there is little or no thinking which is not tinged or more or less pervaded with feeling or emotion. When there is an emotional or a feeling content mixed with the thinking it is an indication that either the neural processes used in thinking do not readily form themselves for resolution into overt or peripheral activity expression (in which case there is some degree of unpleasantness), or that organic or peripheral sensory processes, not organized into quantitative and discrim-

inative perceptions, are resulting from the distortion or displacement of some activity adjustment, or finally that the neural processes employed in thinking eventuate synthetically and incrementially so effectively into overt activity expression, or into neural sets which are preparatory to such expression, that pleasantness ensues.

Hence, we are justified in concluding that there is no separate or indivisible mental element which we may call emotion. If there is any psychic factor other than feeling, which is in any sense especially peculiar to emotion it must be the lower organic and peripheral sensory elements which are not organized into definite percepts and which therefore do not function effectively in intellectual life, although they do serve in their incremential supplementation as correlates for feeling. The emotion is primarily a negative mental process or complex. It appears only when an original or an acquired neural adjustment process is being modified or inhibited and thus is giving rise to either feeling or thought content, which may be pleasant as well as unpleasant in tone, or when one activity well grounded in the organism through instinct or habit is being displaced or repressed by another, and organic visceral or peripheral sensory elements remain and appear in the consciousness. Emotion, like the feeling and perceptual recognition and sensation, of which it is constituted, would not appear if the organism were able to make its adjustments wholly on the basis of inherited action-patterns. That is why it is so often negative; it indicates a lack of effectiveness in the previous adjustment and that a new adjustment is having to be made.

There is least emotional content in thinking when the inhibition of overt activity, to which the thought processes owe their existence, comes from within rather than from without. Thinking, like emotion, does not occur unless there is inhibition or constructive modification of some activity process.

There is this difference, however, between thought and emotion, that emotion and feeling may proceed from the modification or inhibition of thought processes, as well as of overt activity processes, while thinking is the inner or neural aspect of overt activity processes which are potential but do not immediately secure expression and which may be interrupted or inhibited permanently.[1] The inhibition may take place from without, in the absence of suitable inner preparation. In such cases we are accustomed to say that the interruption or repression comes with a shock; that is, it develops considerable emotion, because of the confused character of the inner adjustment processes. Generally speaking, a higher degree of emotion is generated from external interference or modification of activity than from internal control, because in such cases an internal neural adjustment must be made after the first attempt at external adjustment of the organism has taken place. The internal adjustment is made piecemeal, at first a readjustment of the conscious processes to the partial external adjustment, to be followed by a readjustment externally with a consequent internal readjustment, and so on indefinitely, until both the overt activity expression and the internal neuro-psychic organization are in harmonious adaptation to the demands of the environment upon the organism. When the demand for readjustment comes from without there results a sort of see-saw process in which the confused or emotional processes run high until the conscious aspect separates out into clearly defined concepts and precepts and the emotional side of the sensory content recedes before the recognitive element. The feeling element may or may not diminish, according to the circumstances of inner neural organization.

[1] There is, of course, the further distinction, already mentioned, that rational processes make quantitative distinctions or measurements, while feeling makes only qualitative discriminations of varying intensity and emotion represents a mixture of the two, with especial emphasis upon the latter method.

When the interruption or inhibition is from without the most characteristic sensory disturbances appear in the emotional complex of consciousness which arises as a consequence. The flow of nervous energy and impulses, which were going over into external action, is more or less suddenly interrupted and stopped. Because the organism is adjusted to this expenditure of energy all action and expression cannot immediately be suspended. The flow of adrenalin and the supply of sugar to the blood will not immediately cease. The activity attitude, or even the organization of the neural processes along the lines of thought, cannot be immediately repressed or undone. Consequently organized drives and impulses will seek other outlets. If there were some previsional internal adjustment it would be easy enough, ordinarily, for the set to be satisfied by other channels internally or cortically prepared. But where there is no such previsional or conscious or inner preparation for modification of the response the readjustment must be sudden. As a consequence, there is an overflow of nervous energy and impulse into such pathways as are open or partially open. Thus we have trembling, stammering, twitching, aimless and uncontrolled activity on the overt side. On the sensory side we may experience visceral or other organic sensations, or even peripheral sensations, due to the backflow or overflow of the nervous impulses to the sensory end organs, or as a result of uncontrolled and spasmodic innervation of muscles and glands which set off neighboring sensory processes in unexpected and unfamiliar ways. In the more extreme cases illusions and even hallucinations may result from this external interruption and the consequent internal overflow and backflow here indicted. Necessarily such irregular sensory disturbances are not well organized and often they are not adequately localized. Even when organized perceptually, as illusions and hallucinations, they lack a logical or customary causal relationship and are spoken of as irra-

tional. These various "irrelevant" and unexpected sensory and perceptual manifestations constitute well-recognized elements in the more violent emotions proceeding from radical external interruptions.

Such overflow sensory contents of emotions are likely to have associated with them the feeling tone of unpleasantness, because they arise in a situation where interference is dominant over constructive synthesis of neural processes. But gradually, as the organism readjusts itself internally or neurally and overtly or muscularly, the conflict element drops out and the random overflow of energy is absorbed into new channels of regular expenditure. Consequently, the unorganized sensory elements in the emotion tend to disappear or diminish, and the pleasant feeling tone increases, because of the increasing synthesis of neural activities consequent upon the development of new processes of overt adjustment expenditure. Or, if the reorganization proceeds internally, without new overt expression or adjustment expenditure of energy—that is, if the individual stops to think out a plan of action or an adjustment—the random sensory elements in consciousness tend to be absorbed into regular thought processes, and unpleasant feeling tone is likely to give way to pleasantness. But where the readjustment, after the external interruption, takes place internally, or in thought, instead of overtly, or in action, the emotional disturbance is likely to disappear more slowly, because it is more difficult to distribute in an orderly manner the excess of diverted energy through cortical channels only. A similar result, with regard to the absorption of random sensory disturbances and the substitution of pleasantness for unpleasantness within the emotion, may occur without any active readjustment of overt expenditure of energy and without drainage into orderly thought processes. In other words, the organism may simply rest—even sleep—following some strong emotional disturbance, due to external interference or inhi-

bition. In such cases the generation of nervous and muscular energy seems to stop, and random overflow sensory disturbances cease also. The growth of pleasantness tone, in such a case, apparently results from an increasing synthesis negatively induced. That is, interruption of neural functioning is diminished. If there is any increase of neural synthesis it arises primarily from the restoration of a normal adjustment of the organic function, and very little or not at all from the perfecting of an external adjustment of the organism or the growth of rational and organized perceptions into successful thought. Because of this negative character of the neural synthesis, its incremential ratio is usually low, and the consequent pleasant feeling tone is likely to be slight. However, when the recovery from the emotional disturbance is rapid—that is, when relaxation is rapid and complete and sleep or rest comes quickly—the process may be a highly pleasant one. The individual is conscious of a delicious repose and heightened organic well-being.

On the other hand, if the inhibition or modification of the overt activity processes proceeds from within, it is an indication that the inner neuro-psychic mechanisms are well organized and controlled and that they are functioning as thought complexes rather than as feeling and emotional organizations or correlates. In such a case the readjustment can be carried through with little emotional strain, because the overt activity expression and the environmental demands are foreseen and taken care of in the inner conscious or subconscious adaptation before the adjustment has to be made externally. That is, overt action is thought out before it occurs and it proceeds according to plan or pattern. The emotional element, which on the sensory side normally represents incomplete recognitive organization, is reduced or limited in this type of cases largely to the feeling correlates, because the sensory elements have been organized into rational processes in the service of a

conscious and previsional adjustment of means to ends. Thus, much of what is commonly called emotion is eliminated or transformed into thought. In such a case as this the inner neural adjustments which correlate with consciousness are formed with a minimum of hesitation or inhibition. As explained in Chapter V, the inner neural organization, with its unimpeded consciousness correlation, is substituted for the overt activity expression, for the functional reasons stated there, and we have, for the time being, thought instead of overt action. But later overt action may occur, and with greater effectiveness of adaptation because of its temporary inhibition or suspension.

In the cases where the inhibition arises from factors in the external environment, the overt activity is also transferred to the inner neural organization with its consciousness correlates—feeling, emotion, thought,—but in such a case the inner organization is induced after the fact of interference by the environment and consequently it reaches the rational plane—if it ever does—only after passing through the unorganized sensory and feeling aspects of consciousness which more typically constitute emotion. Hence, we say that in such cases the subjective reaction is emotional rather than rational. But if the inhibition or the constructive modification arises from within, it proceeds from the type of neuropsychic organization then dominant, and the resulting adjustment is characterized by this type of mental life, or is said to possess its quality. That is, it is hedonic (pleasure-seeking), emotional or rational, as the case may be. If rationally conditioned, the resulting adjustment will tend to be orderly and well thought out beforehand, unless the external environment interferes unexpectedly or cataclysmically and introduces the element of disturbed emotionality.

An emotion is always determined by the interruption or the constructive modification of some inner neural or overt activ-

ity process. The way in which the feeling element in the emotion arises has already been described. It is the result of the increasing supplementation or the interference of neural processes, according as the feeling tone is pleasant or unpleasant. The sensory element in the emotion, on the other hand, may arise as an incident of the modification of either the overt activity or of the thought processes, the changed current running over into sensory disturbances directly or indirectly into muscular or glandular activity which promotes sensory disturbance as a secondary result. But the most violent sensory manifestations in emotion arise from the blocking of action or thought by some sudden outside interference which results in an overflow of energy or impulses with consequent sensory disturbance, usually of an unorganized sort. This process has already been described in some detail. The sensory and the feeling elements are present in some proportion in all emotion. Otherwise we have either feeling or sensory processes, which are not properly called emotion, if they occur alone.

The sensory element in emotion may vary from the lowest vague visceral processes to the perceptual and even the derivative conceptual elements. The vague organic sensations connected with feeding, digestion and assimilation, reproduction, motion, muscular tension and perhaps glandular disturbances, are among the lowest and less well-defined sensory elements. Various peripheral sensory disturbances, such as superinduced sensations of heat and cold, pain, tactual sensations, also come in as better defined intermediate sensory elements in emotion. But the higher exteroceptive senses may also be disturbed by the overflow resulting from blocking an activity process. For example, one may have illusions of odors or tastes, of vision and of hearing, when in an emotional condition. Hallucinations, especially of sight and hearing, may arise, as was the case with Lady Macbeth. And, finally, these disturbances of

the sensory processes may even extend into the rational and conceptual processes, where, in extreme cases, the aberrations of judgment and understanding become so great as to render the person suffering from them insane. Paranoiac and dementia præcox states are chronic and standardized disturbances of this character. It is now recognized by psychiatrists that paranoia and dementia præcox are functional or emotional rather than organic disorders.

This view of emotion is in conflict with the theory of McDougall which holds that the emotion is the consciousness aspect or correlate of the unchanging central segment of the instinctive action mechanism. This theory, however, finds a place for emotion only where the central segment is modified, or interrupted altogether. It holds that the emotion is in part the consciousness correlate of changing central processes. But, at least on its sensory side, the emotion may not be the correlate of the neural pattern which is being modified. It may result from the complete inhibition of some activity process with the consequent overflow and sensory disturbance already noted. Also feeling processes may arise secondarily out of this sensory and activity disturbance which results from the inhibition of some other activity. Or the interruption may be of a neural thought system in the brain, with its consequent overflow into secondary or superinduced sensory and feeling content. In such cases the sensory and feeling elements of the emotion are not correlates of the new and substitute activity or thought system which is being established, but are rather in opposition to or in interference with these. Thus the nausea, numbness and constriction around the heart accompanying fear proceeding from too sudden contact with a bear in the woods, the voiding of excrement in extreme fright or strain, the sensory disturbances arising from the suspension of visceral functions due to strong demands upon the organism from outside, the drying of saliva and fullness in the throat,

the flow of tears, the suspension or panting of the breath, the rapid or interrupted heart-beat and flow of the blood, the dimming or quickening of perception of the senses, and the like, may be taken as examples of physical and sensory disturbances which are in opposition to, rather than correlated with, the dominant modified or newly established activity or thought system. They are, in many cases, the scattered remnants of the old action or thought systems. In other cases they are overflows from modified processes of which the energy supply has not yet become distributed in well correlated channels elsewhere. From this brief analysis it must be clear that McDougall's claim for the fixed correlation of the central segments of the instincts and the conscious content of the emotion is not tenable. The facts about emotion do not bear out his hypothesis. They flatly contradict it.

CHAPTER XIX

THE EMOTIONS AND SENTIMENTS

Emotions may be classified in a great many ways, according to the viewpoint or interest of the one who makes the classifications. One of the most common classifications is based upon the feeling tone content of the emotion. From such a viewpoint emotions are either pleasant or unpleasant. This sort of a basis for the classification of the emotions is especially likely to be used when there is confusion in the mind of the classifier as to the distinction between feeling and emotion.

Another criterion of classification may be called the functional. This classification is based on the adjustment situation in which the emotion is supposed to serve. This sort of classification is illustrated by the one quoted from Warren below under the caption of "Human Emotions." A somewhat similar basis of classification separates emotions generally into the aggressive or assertive and the regressive, of which the defensive is a large subdivision, although the defensive emotions are sometimes also assertive and aggressive. Ordinarily, but not always, the aggressive emotions are pleasant and the regressive unpleasant. Thus fear is usually unpleasant, but when one is escaping from the object of which he is afraid the emotional complex may contain a large element of pleasant feeling. Also, anger may be either pleasant or unpleasant, according as one recognizes an advantage or a disadvantage with regard to one's relation to the object of anger. It is pleasant to defeat one's enemies, but it is unpleasant to be defeated by them. Another classification of the same general type may be made on the basis of emotions connected

with approach toward an object and emotions connected with retirement from an object. This, however, is not always a usable distinction, because some emotions, like anger, may be associated with both types of action.

One may also speak of higher and lower emotions. Generally, the higher emotions are those in which the sensory content is organized into percepts or abstracted into concepts and the feeling content arises from the supplementation or interference of cortical or organized sensory processes. The lower emotions are constituted of lower organic and relatively unorganized sensory elements and of feeling proceeding from visceral, reproduction or other lower functional processes in correlation or interference. In some degree at least the higher emotions may be said to be more intellectualized and the lower ones to be concerned with the valuation of those adjustments connected with survival and perpetuation of the species. Such a classification does not necessarily imply a moral valuation, although in general, perhaps, we may say that the higher emotions are morally or socially more acceptable and æsthetically most approved. But doubtless there are important exceptions to this generalization. It is, of course, not impossible to classify emotions on a social or moral basis, but in doing so we pass from the neurological and physiological basis or account of emotions to a sociological consideration of them. The same objection which we earlier opposed to such a basis of classification of instincts holds also in large measure with reference to the emotions. They are not to be defined descriptively from the standpoint of their social value, but rather from their neurological and physiological correlation. We may, however, classify and evaluate them sociologically as a preliminary to selecting and utilizing them by means of our knowledge of them neurologically and organically, that is, for purposes of social control.

One of the most common classifications of emotions is with

reference to the kind of overt activity expression which accompanies them. Thus we speak of anger, fear, hate, the sex emotions, hunger, filial, family, retributive, altruistic, competitive, etc., emotions. Some of these overlap and, furthermore, from the standpoint of definition, they are open to the same criticism as the classifications on the basis of function and moral or social values. In fact there is much overlapping between this classification and that on the basis of function. Also, the emotions, classified on this basis, are not in themselves separate and distinct. They overlap and are easily transformed into one another. For example, it is not always possible to distinguish between anger and hate or even between anger and fear, or in some cases between love and anger or hate. Fear becomes anger when the subject of the emotion develops a recognition of capacity to overcome the object instead of recognizing himself as being in danger of being overcome by it. Love may be transformed into anger by the recognition that the object of the affection has betrayed the subject, and this emotion of anger may, by extending the recognition content, be deepened into hate.

Thus it may be said that the recognition content of the emotion largely, if not completely, dominates the identity of the emotion. Feeling dominates the definition of the emotion in so far as that definition is dependent upon the existence of a pleasant or unpleasant feeling tone. But the most numerous characterizing elements of emotion are those which we call sensory. This is partly because they are localized, while feeling is not localizable. This fact enables us to define the emotion in some degree according to its sensory reference, as sex emotions, love emotions, the emotion of anger and disgust, etc., according as the sensory concomitants are referable to primary and secondary physiological sex centers, the heart and breast, the flushing of the face, hot flashes through the

body, tingling of the spine, twitching of the lips, etc., or to visceral disturbances which, in extreme cases, may eventuate in vomiting. In much the same way we speak of intellectual emotions when we recognize the sensory reference as being of a highly organized character which takes the form of the intensification or distortion of perceptions and concepts. This sensory content, which plays such a large part in the make-up of emotions, is the recognitive element in emotion, for not only does it enable us to localize the sensory and organic disturbance, but it also enables us to discriminate between emotions on the basis of the kinds of sensory elements involved. Thus the visceral and other more primitive organic sensations and sensory complexes, such as the kinæsthetic and muscular sensations and strains, generally characterize what we ordinarily call the lower emotions. At the other extreme we have the more definite and quantitative recognitive sensory elements, arising as visual and auditory percepts and their complexes, in the highest or most intellectualized emotions. The middle ground of peripheral sensations, especially pain, pressure and heat and cold perceptions, distribute toward either emotional extreme according to the circumstances in point.

The higher recognitive elements, such as percepts and concepts, may change the whole attitude of the organism toward the environmental pressures. Not only may the permutations of recognition constitute the difference between two closely related emotions, like anger and hate, or sex love and parental love, but they may even change the feeling tone and thus produce a major metamorphosis of emotional processes and attitudes. In the former case parental love and sexual love apparently differ only as we recognize the object of affection as offspring or as sexual mate. In the one case we have a tender protective attitude with possibly certain localized sensory disturbances in the breast or other parts of the body which have frequently come in contact with the object of the

emotion. In the other case we have an attitude of tenderness and domination, possibly accompanied by certain sensory disturbances as before, but also in the sexual regions of the body, because of their organic connection with this kind of love. In both cases, especially if these types of love have been intellectualized and sublimated as is customary among the more civilized peoples, there are numerous perceptual and conceptual recognitive elements in consciousness which relate to memories of previous experiences, measurements of values in the relationship, potentialities of further developments or extensions of the relationship, and all sorts of things which one may "think" concerning child or lover. These cannot be detached from the emotional situation except by a process of abstraction. On the other hand, the recognition of opposition or unfaithfulness on the part of the object of the emotion will change the feeling content, with the result that the feeling content which is pleasant in the two cases mentioned above will become unpleasant. The other recognitive elements may remain much the same on the perceptual side, although some of the conceptual elements, such as valuation of the relationship and the measure of potentialities of development may change. When the opposition is recognized as coming from without and as being directed against both the subject and the object of the emotion, affection will usually remain and both pleasantness and unpleasantness will exist in the same emotion. Merely the character of the parental or sexual love emotion changes in such a case, for there can be as many varieties of these emotions as there are varieties of recognition of situation and relationships where they are developed. But if the opposition or unfaithfulness is recognized as coming from the object, affection may be changed wholly or in part into hate or aversion or disgust, while the major part of the higher recognitive elements remain much the same. The lower recognitive elements, the relatively unorganized sensory

elements, are modified to correspond to the type of emotional expression; in fact they do much to constitute its identity, as do the higher elements.

Where an emotion of love is transformed into one of hate or disgust by a change in the higher recognitive elements, the previous emotion may be retained in part. It is not an uncommon experience to love and hate the same person and even to feel disgust with a loved person. But if the recognition elements which produce the new emotional attitude grow in volume and definiteness the transformation of the emotions becomes more and more complete. Most people have had the experience of having one emotional attitude transformed gradually into another, as the result of a progressive recognition of new elements in a situation. Sometimes the reverse process occurs. The process of exercising an emotion, especially when it is employed to excess, sets up sensory processes —usually of the lower unorganized sort, but possibly also of the higher intellectual type—which characterize and initiate or generate a new, often an antagonistic, emotion. Thus the excessive devotion of the lover or parent sometimes fosters an attitude of disrespect in the child or lover. Turning the other cheek sometimes generates excessive anger instead of gentleness and humility. Sex satiety often produces disgust, or even occasionally hate or disloyalty, in the subjects themselves. Many examples of this sort might be cited; but the prevailing relationship is of the kind previously stated, where the recognitive element initiates the emotion rather than proceeds from it.

So close is this relation between recognition content and emotion that we might even question the existence of any fixed forms of emotion whatever. The fact seems to be that emotions are constantly being transformed into each other, primarily as their recognition content changes. This hypothesis is further substantiated by the fact that the overt or bodily expressions of emotions are not easily distinguished

on the basis of the emotions of which they are supposed to be characteristic. The expressions ordinarily attributed to one emotion merge into those attributed to another, just as the emotions themselves are transformed one into the other. The fiction of definite and distinct emotions arises from the logical device of classification or description. Seldom in life do we find definite divisions between phenomena, but we attribute clear-cut distinctions to them for the sake of logical manipulation in our thinking. The separateness of emotions is therefore a logical fiction, not a fact.

Finally, we may consider the classification into primary and secondary or derivative emotions. The writers who use this classification usually have in mind a distinction on the basis of heredity or the degree of primitiveness of the emotion. McDougall means by a primary emotion one which is the inherited affective correlate of the supposedly unchangeable central segment of the instinct mechanism. This assumption of an inherited conscious correlate we have already shown to be an illusion of interpretation. Those writers who employ the terms to cover the more primitive emotions may appear to have more of a justification for their usage. Those emotions which are characterized by strong visceral and other organic sensory disturbances and which arise in connection with reproductive, nutritive or other vegetative functioning of the organism, may properly be termed primary in the sense that they are probably the oldest emotions in the race. Also they are most likely to remain most nearly unchanged in their form of expression. That is, they are most stable in the physical or overt expression which characterizes them, in the sensory content and in the higher recognitive elements which go along with them. Even the feeling tone which accompanies them is likely to be less variable than in the case of the higher and more intellectualized emotions.

These more primitive emotions may be modified through the process of sublimation into derivative emotions. Thus, some writers have supposed that filial and parental love were sublimations of sex love. This, however, is not necessarily correct. Sublimation into derivative emotions does not ordinarily take place across recognition content, but through an extension of recognition content in the direction of intellectualization and definition. Thus the sublimation of the sex emotions would be into the derivative forms which we find in literature and art and which deal with sex in its intellectualized and technic expression. This process of sublimation of a crude primitive emotion is a process, not only of intellectualization, but also of æsthetic refinement and development. The same tendencies toward intellectualization and refinement may be illustrated from other emotions also. Crude patriotism grows into a love for and loyalty to the higher aims of all humanity. Primitive devotion to offspring may be intellectualized and spiritualized into interest in and devotion to the welfare of all children, of all classes and races, everywhere. Some social thinkers fear the ultimate result of a progressive sublimation of emotions which turns the primitive or primary types into derivative forms and content. They anticipate that such a process of sublimation may eventuate in a deterioration of the native vigor and moral stamina of the race. But there is little justification for this fear, if the process of intellectualization and sublimation is guided by well-established values, that is, if it is carried out under the dominance of social science instead of at the behest of a hedonistic æsthetics or a subjectivistic ethics.

The more sublimated and intellectualized an emotion becomes, the more secondary its character, the less easily it can be defined in terms of its lower organic and poorly organized sensory content; also the more variable it becomes. Thus the secondary emotions are not so readily and obviously distin-

guished from each other by their visible signs as are the primary or more primitive emotions. Their definition must be made in terms of their higher recognition content, and this is comparatively difficult for those not skilled in the process. Also, those who live nearer what we sometimes call an animal plane of existence do not experience the higher or more sublimated and intellectualized emotions sufficiently frequently to enable them to recognize or classify them within themselves with any great facility. Thus the higher emotions of social loyalty, devotion to social welfare and progress, or the less social emotions of æsthetic appreciation of classical music, "good" literature and art, are familiar affective content only to the "élite." The person of poor breeding does not recognize his poor taste. The so-called moral imbecile is not aware of the world of social obligation which lies beyond his horizon of thought and feeling. The typical ward politician has not dreamed of the wider obligations of man to man. The typical subjective religionist, who bends all his energies to saving his own or another's "soul," so frequently neglects alike the lesson of the good samaritan and his obligation to good citizenship of a higher order, and he is unable to understand why his brother with a quickened social conscience regards him with pity or contempt.

In general, we may say that the emotion has as much inner unity and constancy of form—is as definable—as the activity or activities to which it corresponds or in connection with which it arises and from which it secures its organization, have unity and constancy of form. Thus the primitive or primary emotions are attached to fairly definite activity processes and are usually fairly easily recognized by their visible as well as subjective signs. But the more sublimated and derivative emotions have a vast number of forms which are constantly changing like the higher recognition and sensory and feeling contents which constitute them. McDougall assigns primary

emotions to his seven primary "instincts," but he is doubtful about the emotional correlates of his secondary "instincts," and he finds no definite emotional correlates whatever for the so-called general innate or instinctive tendencies, such as play, imitation, suggestion and sympathy. This is what we should expect in the light of our analysis. While his primary "instincts" are only habit complexes, they possess sufficient unity and constancy of function to embody a fair degree of unity and constancy of recognition content, especially of the higher orders. Hence we may recognize his corresponding emotions as possessing a certain unity of consciousness and of definition. But this unity is general. Within these emotional complexes, which we recognize as possessing a certain degree of inner similarity and unity, there is a wide range of variation. For example, anger varies widely according to its recognition content; and the same may be said of the other primary emotions of McDougall. They are not, as his discussion might lead one to suppose, identical under all conditions of manifestation. Nor are all of them truly primary or primitive emotions in the sense in which we have defined that term here. Some of them are sublimated and intellectualized emotions. Nevertheless, they are highly standardized, possessing recognitive unity and therefore capable of definite classificatory categories, because they correspond to well-recognized habit or value complexes imbedded in our social traditions and valuations, and they themselves constitute well-recognized value complexes.

McDougall was unable to find definable emotional complexes to correspond to his secondary "instincts" and general innate tendencies, because they lacked unity and constancy of content. They are not even habit complexes. In so far as they possess social-value unity and are recognized as having such, they have a diffused emotional value content to correspond, but this varies and transforms itself so rapidly that it

is difficult to place the analytical finger upon it and name it. The secondary "instincts" have such a decidedly variable value and activity content, but no one would deny that the quality of gregariousness, for example, has a diffused and variable emotional correlate, but its abstractness and vagueness make it difficult as yet to localize and name it. The almost total lack of unity, from an activity standpoint, of the so-called general innate tendencies precludes any unity of emotional content which would render it possible to assign names to their general emotional expression. However, the concrete activity functions which correspond to the various forms of activity content in imitation, suggestion, etc., have emotional correlates, often of a primary quality; for such activity contents are as frequently definite and primary in character.

The conception of emotion here set forth does not provide for its definite separation as a concept from sentiment, as that term is used by McDougall.[1] In fact there is no distinction, except possibly one of degree of organization and of recognition of relationship between object and subject. A sentiment is an emotion in which definite feeling tones are organized about a more or less definite recognitive element or process with a value reference to the subject. In the sentiment the object is analyzed and more or less clearly defined. But the attitude toward the object of attention is not merely one of analysis and definition, such as might exist in a dominantly or purely intellectual attitude. The object is also definitely a source of pleasantness and unpleasantness—consequently the attitude is an affective one. In the lower forms of sentiment the object need not be recognized as a source of pleasantness or of unpleasantness, although it must be such a source. The affective or sentimental attitude can exist toward the object without an attempt to measure its hedonic effect upon the subject.

[1] *Op. cit.*, ch. 5.

But the subject must recognize his own attitude toward the object, at least more or less clearly. Even the very young child recognizes its sentiment or love for its parents; and it is possible that animals which can develop affective attitudes recognize some degree of affection for the objects of these attitudes, although doubtless not in reflective or analytical terms. However, the higher sentiments probably always carry with them a recognition, not only of affection for the object, but also an intellectual appreciation of the effect of the object upon the subject. The effect need not necessarily be stated in hedonic terms. The object may simply be called good or beautiful or fine or noble, or by some other term of appreciation or value, carrying more or less of the implication of the satisfaction to be expected from the object by the subject.

The lower emotions, the more primitive ones, may involve little or no sentiment, because they do not recognize or define the objective cause and therefore the subject does not develop a definite affective attitude towards it, much less an appreciation of its hedonic consequences for the subject. But sentimental attachments to objects which produce pleasure may arise even in connection with the lower emotions, in addition to the unorganized non-recognitive sensory content, when the evaluative element is clear and well defined. Thus even people very low in the cultural scale may have strong sentimental attachments for objects of sex love or for sources of food and drink. Sometimes these sentiments, largely because of the lack of more sublimated competing sentiments or emotions, are stronger in the ignorant and uncultured than they are in the highly civilized and cultivated. A sentiment is an emotion with a definite recognitive element acting together with a strong feeling tone as value consciousness, and the more highly developed the recognitive or intellectual element the more sublimated is the emotion, the finer the sentiment. The higher and finer sentiments are those which are most social-

ized or defined on the attitudinal side. In them the attention is centered, not so much upon the self as a recipient of crude feeling satisfactions or distress as upon the wider social significance and value of the object, or at least upon its more refined and sublimated intellectual and æsthetic significance and value. Thus we generally regard the lower sex sentiment, lust, and the lower social sentiment, hate, with disapproval. With these we contrast favorably the sublimated sex devotion of a Dante for Beatrice or of a Petrarch for Laura. Similarly we contrast admiration with hero worship or an ethical patriotism, which is not afraid to acknowledge national wrong for the sake of righting it, with a jingoistic patriotism and narrow nationalism, to the disadvantage of the latter in each case. The dogmatist's devotion to his religion which causes him to burn or place upon the rack those who disagree is a low and unmoral sentiment as compared with the Christ-like or Buddha-like devotion which forgives and serves. Knowledge or science, that is, a broad and penetrating analysis of the object and its functional relationships within its environment, makes for a refinement of sentiment. The truly cultivated person is catholic and tolerant and his sentiments are refined, even if not always so vigorous.

McDougall properly speaks of the rôle of the self-regarding sentiment in the development of character.[1] The self-regarding sentiment is indispensable to character formation. Character growth is a process of integrating the self-consciousness as a means to building up an internal control over conduct through the personality. The personality which possesses a strong self-consciousness with an affective attitude toward the self—the essence of the self-regarding sentiment—is a strong character. Whether it is also a good character depends on whether the self-regarding sentiment is merely hedonistic

[1] *Op. cit.*, ch. 9.

and self-seeking or is socialized. A good character is one which not only has a strongly organized self-consciousness but also has a strongly developed social consciousness, with a well balanced and coördinated affective attitude toward both the self and society. In other words, a social-regarding sentiment is quite as important in the development of a *good* and *strong* character as is the self-regarding sentiment. As Professor Cooley has pointed out,[1] self and social consciousness properly grow up together and neither can be complete without the other. In the same way neither the self-regarding nor the social-regarding sentiment can reach the highest and finest fruition without the other. However, it is possible to develop either of these sentiments which are so important for character development in a lopsided and incomplete manner, just as we may develop either self or social consciousness out of proportion as regards the other. The old individualistic ethics was largely metaphysical and barren because it failed to see the importance of either the social consciousness or the social-regarding sentiment for a functional character development. And one may suspect McDougall of retaining in some degree this bias in his discussion of the growth of the self-consciousness and the advance to the higher plane of social conduct.[2] He certainly lacks the appreciation of social values and pressures in the character-building processes which is characteristic of Cooley's writings. The more intellectualized and analytical these two character-forming sentiments become, provided they also retain their affective element, and value reference, the more serviceable they may be as control processes.

All of McDougall's primary emotions are sentiments, except possibly the crudest and most primitive forms of fear,

[1] *Social Organization* and *Human Nature and the Social Order*. J. M. Baldwin, in *Social and Ethical Interpretations* and *Mental Development in the Child and the Race*, has emphasized the same principle.

[2] *Op. cit.*, chs. 7 and 8. See also ch. 9, on volition.

anger and wonder. In the lower forms of these emotions there may be absent all definite recognition and value content. One may be simply afraid without clearly recognizing any object of fear, or angry without being definitely conscious of being angry at anything or any person in particular. Possibly one may have a vague attitude of wonderment without being able to assemble one's consciousness about what causes the wonder; there may be simply a feeling or sense of being oppressed with more than one can understand, or the attitude may be one of seeking to understand with a high degree of nervousness at the difficulty of defining the stimuli. But ordinarily the subject recognizes the object of fear or anger or surprise and develops an affective attitude toward it. In the higher forms of emotion involved in righteous anger, or in safeguarding the public welfare and in the pleasant pursuit of scientific knowledge of puzzling problems, we have highly sublimated and intellectualized or socialized sentiments.

The other primary emotions of McDougall are perhaps always sentiments or types of sentiments. Thus negative and positive self-feeling obviously are affective interpretations of the self, with more or less reference to environing conditions. The emotions of disgust and tenderness represent general types of sentiments corresponding respectively to the unpleasantness and pleasantness affective attitudes which may be attached to any analyzed and defined object which the environment brings into consciousness. Consequently, disgust and tenderness are not so much emotions or sentiments as they are general emotional or sentimental attitudes towards objects. We are disgusted with objects which are unpleasant to us, and in extreme cases they produce the lower and unsublimated emotional expression of nausea and vomiting. In the cases where our attitudes are more intellectualized and sublimated we merely disapprove. Similarly we may have a tender attitude toward any object which affords pleasure to

us, and this attitude may vary from blind adoration, such as is illustrated in Shakespeare's story of *Romeo and Juliet*, to one of approval on intellectual or broad objectively stated æsthetic principles. Disgust and tenderness are not emotions and sentiments, but attitudes basic to as many specific emotions and sentiments as the permutations of the recognitive and feeling elements in consciousness can organize into distinct categories subject to our disapproval or approval. They are types of emotions and sentiments and within these two types we can range almost all specific emotional attitudes. Thus under disgust we may place the vast range of fear sentiments, each defined in terms of the object of the fear. Here also belong the hates and aversions, but only in part the sorrows, and disappointments, for there is an element of tenderness in these also. Under the tenderness type are to be found the loves, defined and distinguished according to the objects recognized, sympathies, joys, good wills, and the like. The objects toward which one may be tender are infinite in number, ranging from human beings, through material objects, to principles. The only constant or stable element in tenderness is the feeling tone, and even it may vary in intensity, if not in quality or kind. And the same is true of disgust. The differentiation of these attitudes into concrete or specific emotions and sentiments is accomplished through the differentiation of the recognitive element which functions as a complement of environmental pressures rather than of inheritance or instinct. The basic feeling tones remain constant in each type of cases; but the degree or intensity of the feeling tone varies according to the organization of the specific sentiment involved.

The secondary emotions which are listed by McDougall,[1] and which he does not regard as sentiments, would, according

[1] *Op. cit.*, 8th ed., 128 ff.

to the analysis here presented, be classed as sentiments as well as emotions. Of admiration he says, "This is certainly a true emotion, and it is as certainly not primary. It is distinctly a complex affective state and implies a considerable degree of mental development." [1] These are just the conditions—an affective attitude towards a defined object with a recognized value significance for the subject—which render the emotion a sentiment. According to McDougall, admiration is a complex or derivative emotion made from the fusion of the two primary emotions, "wonder and negative self-feeling or the emotion of submission." [2] It is possible to regard some emotions and sentiments as being compounded out of other emotions and sentiments, and we might therefore describe admiration as a sentiment composed of the sentiments of wonder and negative self-feeling, or of the emotion of wonder (when of too low an order to constitute a true sentiment) and the attitude of submission *and* of those other recognitive elements which definitely describe or locate the particular kind or form of admiration which is under consideration. There are, of course, as many varieties of admiration as there are of recognition and wonder and submission (if we accept as truly descriptive the composite or atomic theory of the sentiments and emotions) connected with it.

But one should be very careful about accepting the atomic theory of the sentiments and the emotions. In his discussion McDougall uses this basis of description altogether, treating each complex emotion as a compound of unitary and indivisible primary emotions and each sentiment as a complex of one or more emotions or sentiments organized around the idea of some object.[3] This is too mechanical and artificial. Each emotion and sentiment is an organic whole, possessing its own individuality or complex of traits, according as it varies in character. That is, the composite units in an emotion or

[1] *Ibid.*, 128. [2] *Ibid.*, 129. [3] *Op. cit.*, ch. 6.

sentiment are not emotions and sentiments which may be added or subtracted mathematically, like so many bricks in a wall, but they are feeling tones and sensory (including recognitive) elements, and, because the feeling elements vary in quality and intensity and the sensory content varies infinitely in variety of original units [1] and of their recognitive permutations, there can be as many forms and shades of emotion and sentiment as there can be variations and combinations of these basic elements—and this is infinite. Thus, each emotion and sentiment, and each variety of these, is built up from the basis of feeling and sensory (including recognitive) content into an individual organization, not from other supposedly unitary primary emotional units or bases. That is to say, the dynamic elements in emotions and sentiments are feelings and recognitive elements. Because of this fact we have a much greater variety of emotions and sentiments than would be possible if so-called primary emotions and sentiments were basic building material. The variety and shading is infinite.

Yet, in spite of this great variety and fluidity of emotions and sentiments, we have certain more or less standard or recognized forms of emotions and sentiments. Thus, besides the so-called primary emotions, which we have already analyzed, McDougall lists the following complex emotions.: [2]

Admiration	Hate (?)	Shame
Reverence	Envy	Bashfulness
Gratitude	Reproach	Joy
Scorn	Anxiety	Sorrow
Contempt	Jealousy	Pity
Loathing	Vengeful emotion	Happiness
Fascination	Resentment	Surprise

[1] C. J. Herrick says there are more than twenty different senses. *Introduction to Neurology*, 79.

[2] *Op. cit.*, ch. 5.

The first nine of these emotions, he says, do not necessarily involve sentiments. The remaining twelve do imply the existence of sentiments. According to our analysis, we would classify all of them as sentiments as well as emotions. McDougall regards all of these emotions as instinctive or as compounds of instinctive processes. The present analysis regards all of them as affective attitudinal complexes built up primarily under the domination of the environment, which works through the recognitive elements, as explained in earlier chapters. In this respect they are very similar to his supposed instincts.

Warren has a much lengthier list of emotions, which he breaks up into several subdivisions, as follows: [1]

HUMAN EMOTIONS

1. *Expressive (Nutritive)*

Emotion	*Basis*
+Joy (Enthusiasm)	Diffused feeling
—Grief (Despair)	"
—Shock	"
+Mirth	"
+Ecstacy	"
Restiveness	"
Exuberance	Play
+Wonder	Curiosity

2. *Reproductive*

Emotion	*Instinct*
+Love	Mating
+Lust	"
—Jealousy	"
—Coyness	"(female)
+Tenderness	Maternal

3. *Defensive*

Emotion	*Instinct*
—Fear	Flight and Hiding
—Disgust	Avoiding
—Timidity (Embarrassment)	Shyness
—Shame	Covering
+Awe	Subjection

4. *Aggressive*

Emotion	*Instinct*
—Anger (Passion)	Fighting
—Hatred	Resenting
—Envy	Rivalry
+Pride	Domineering
+Exultation	"

5. *Social*

Emotion	*Instinct*
+Affection	Family
+Cordiality	Gregarious
—Pity	Sympathetic

6. *With Temporal Projection*

Retrospective Reference:

—Regret (Remorse)

+Satisfaction (Elation)

Surprise

[1] *Human Psychology*, 299.

HUMAN EMOTIONS—*Continued*

Social Emotion	*Instinct*	*Prospective Reference:*
+Gratitude	Sympathetic	
+Admiration	"	
—Detestation	Antipathetic	+Hope
—Revenge	"	—Dread
—Suspicion	"	Anxiety
—Scorn	"	

In this list he has indicated the feeling quality attached to each emotion, by means of plus and minus signs placed before the emotions, and also the psychic or activity organization to which it corresponds. Even this list by Warren does not exhaust the category of emotion, but it approaches more nearly toward a complete enumeration of the well-recognized or standardized organizations of emotion and sentiment.[1] It also gives us some suggestion as to the proper basis for the recognition of separate emotions or emotion complexes.

These so-called emotions are really emotion complexes which are distinguishable from each other on the basis of the types of activity, attitudes and consciousness (recognitive-sensory and feeling processes) with which we find them associated. It is the activity, attitudinal and consciousness complex or organization which determines the perception of the organic character of the emotion complex and also our naming of it. And the organic character of the activity, attitudinal and consciousness complexes, that is, their functional and putative unity of organization, depends in part upon the unity of the physical organism which exercises the complex more or less as a unit. Thus, for example, the definition or characterization of lust, flight, shame or anger is dependent in part upon the functioning of certain parts of the body or of the whole body in certain ways. This is likely to be the case where primitive emotions

[1] According to our analysis and definition, Warren includes sentiments with emotions.

are concerned, and not so likely where derivative and sublimated emotions are being considered. In such cases, and perhaps to some degree in all classes of emotions, the definition or identity of the emotion complex or aggregate is determined in terms of or with reference to the value of the accompanying activity, attitudinal and consciousness correlates for the individuals and society or group concerned. Here, as in the case of the complexes miscalled instincts, the recognition of value plays a large, often a dominant, rôle in characterization or definition. Because of such definition and organization into complexes on the basis of structural or activity and valuational correlations we are able to group emotions under such meaning categories as enables us to handle them as adjustment processes instead of allowing them to appear to us as anarchic manifestations. We have even gone further in the process of synthesis than the facts warrant, and often we do not recognize that a single term does not represent an emotional unit, but a vast complex of fluid emotional forms having a certain unity or similarity of manifestation or of value. Such an illusion of unity in emotion undoubtedly has its functional value, but it may also have its disadvantages for purposes of psychological analysis.

McDougall classifies the sentiments according to two general categories—according to their emotional constitution and according to the nature of their objects. Of the former method he says, "In dealing with the emotions, we named and classed them according to their nature as states of affective consciousness and as tendencies to action; and we may attempt to name and classify the sentiments also according to the nature of the emotional dispositions that enter into the composition of each one. But since, as we have seen, the same emotional dispositions may enter into very different sentiments, we can carry the naming and classification of them but

a little way on this principle,[1] and we have accordingly but very general names for the sentiments. We have the names love, liking, affection, attachment, denoting those sentiments that draw one towards their objects, generally in virtue of the tender emotion with its protective impulse which is their principal constituent; and we have the names hate, dislike, and aversion, for those that lead us to shrink from their objects, those whose attitude or tendency is one of aversion, owing to the fear or disgust that is the dominant element in their composition. The two names love and hate, and the weaker but otherwise synonymous terms liking and dislike, affection and aversion, are very general; each stands for a large class of sentiments of varied, though similar, composition; the character common to the one class being the fundamental tendency to seek the object and to find pleasure in its presence, while that of the other class is the tendency to avoid the object and to be pained by its presence. . . . A third principal variety of sentiment . . . is primarily the self-regarding sentiment, and is, perhaps, best called respect. Respect differs from love in that, while tender emotion occupies the principal place in love, it is lacking, or occupies an altogether subordinate position, in the sentiment of respect. The principal constituents of respect are the dispositions of positive and negative self-feeling; and respect is clearly marked off from love by the fact that shame is one of its strongest emotions." [2]

In classifying the sentiments according to the nature of their objects, McDougall says, "They then fall into three main classes, the concrete particular, the concrete general, and the abstract sentiments—*e. g.*, the sentiment of love for a child, of love for children in general, of love for justice or virtue.

[1] However, he disregards this difficulty in naming and classifying his so-called instincts; for, as shown in Chap. XVI, the same reflexes or habits repeatedly enter into different action complexes called instincts by McDougall and other writers.

[2] *Loc. cit.*, 160–1.

Their development in the individual follows this order, the concrete particular sentiments being, of course, the earliest and most easily acquired. The number of sentiments a man may acquire, reckoned according to the number of objects in which they are centered, may, of course, be very large; but almost every man has a small number of sentiments—perhaps one only—that greatly surpass all the rest in strength and as regards the proportion of his conduct that springs from them. . . . When any one of the emotions is strongly or repeatedly excited by a particular object, there is formed the rudiment of a sentiment." [1] One of the strongest and most complex sentiments in most people, McDougall says, is parental love.[2] Affection for an equal and active sympathy are also very common. But the self-regarding sentiment is the most important of all in building up character: "There is only one sentiment which by becoming the master-sentiment can generate strong character in the fullest sense, and that is the self-regarding sentiment." [3] McDougall devotes three of his most important chapters,[4] those concerned with the constructive social direction of the individual, to the discussion of the growth of this sentiment. A criticism and evaluation of his treatment in this connection has already been offered in this chapter.

Warren's definition of sentiment corresponds pretty closely to our own: "A sentiment is a mental state whose leading components are feelings and imagery.[5] It is due to the combination of systemic with ideational impulses. . . . Sentiments may be aroused by any sensory or ideational impulse." [6] He classifies sentiments "according to the type of primary expe-

[1] *Ibid.*, 162–3.
[2] He gives an account of its development, *op. cit.*, 165 ff.
[3] *Op. cit.*, 261.
[4] Chapters 7–9, inclusive.
[5] He omits the fact that there must be a recognition of value in the object for the subject.
[6] *Op. cit.*, 302.

rience which arouses them." [1] This method of classification is more closely related to McDougall's second method than to his first, but it corresponds definitely to neither. Apparently he does not accept the atomic view of McDougall which makes the sentiments a mere mechanical combination of the emotions. He is thoroughly functional and builds up each sentiment from the basic elements of experience in much the same way as has been insisted upon in this chapter. He does not attempt a detailed list of the sentiments but classifies them generally according to their supposed origins in experience as follows: [2]

Sentiments	*Source*
Reality Feelings	Perceptions
Beliefs	Ideational States
Æsthetic Sentiments	Systemic States
Dynamic Sentiments	Motor States
Moral Sentiments	Social Situations

While I regard Warren's definition of sentiment as on the whole a good one,[3] an examination of his discussion of his classification headings or types [4] convinces me that he has in mind perception and general attitudinal content rather than true sentiments. He mentions only such concrete examples as certainty, doubt, a sense or sentiment of opposition, of being thwarted, of force or power in the environment, of the inevitable, of the sublime, or of right, of wrong and of the good or bad. These are recognitive terms primarily, although they may have affective aspects or attitudes attached to them. But before they can be true sentiments they must carry some recognition of the value of their objects for the subject.

An attitude is a more general term than the others which we have used. It is based on both acquired and instinctive proc-

[1] *Ibid.*
[2] *Ibid.*, 303.
[3] With the exception noted above.
[4] Warren, *op. cit.*, 303–306.

esses. It is sometimes affective in character; sometimes predominantly intellectual. At other times it is merely physical or organic, with little or no mental content. "An attitude is due to a repetition of neural processes of one and the same type. . . . The relation between the stimulus and attitude factors is illustrated by comparing the experiences of watching a bonfire and a destructive conflagration. The sensory stimuli may be substantially alike in the two cases, but our response is quite different. We assume entirely different emotional and motor attitudes." [1] Warren is here speaking of conscious attitudes rather than of merely physical or unconscious attitudes, and of course the conscious ones are the most significant from the standpoint of emotion and sentiment. Clearly it is the recognitive element, the recognition of significance, which here primarily distinguishes one attitude from another when the stimuli are alike. The recognition of significance is dependent upon past experience or memory.

An attitude is a condition of preparedness of the organism which in the last analysis reduces to preparedness for action. Action, however, is suspended, otherwise the process would be action instead of attitude. Attitudes cease in so far as they go into action. Since attitudes are fundamentally suspended action, with a recognitive element in the higher forms, which evaluates the relationship between the subject and object in either affective or intellectual terms, we can, in these higher forms, describe or classify attitudes "according to the type of mental state which characterizes them. There are attitudes corresponding to each type of experience." [2]

Warren outlines the general classes of attitudes, with their corresponding and characterizing bases, as follows: [3]

[1] *Ibid.*, 361.

[2] *Ibid.* Warren does not give due recognition to the purely physical or organic and unconscious attitudes. His discussion really refers only to those attitudes which have a recognition element.

[3] *Ibid.*, 362.

Attitude	*Mental Basis*
Primary:	
Interest	Perception, Ideation
Desire	Feeling
Attention	Conation
Secondary:	
Dispositions	Emotion, Sentiment
"Appreciation"	Thought
Social and Moral (Conscience)	Social Situations
"Proclivities"	Volition
Of Communication	Language
Of Rational Action	Ideals

In addition to this method of classification,[1] others are possible also. For example, attitudes might be classified as intellectual and emotional or affective, as antagonistic and coöperative or sympathetic, or as good and bad. In this last case, however, the classification would be made, not in terms of the characteristics or structural and mental preparedness of the individual possessing the attitude, but in terms of the value of the attitude for society or any individual concerned. In such a case many attitudes possessing very different structural and mental components might be either good or bad, and vice versa. Such a classification is sociological rather than psychological. Other classifications, in terms of the posture of the individual concerned and in terms of the organs or technique employed, might be made.[2]

In this discussion we are particularly interested in those conscious attitudes which have emotional correlates. One of the completest attempts at such a classification is presented by Warren under the general title of Human Dispositions, as follows: [3]

[1] No attempt to evaluate this classification and the correlation between attitudes and mental bases will be made here. The classification is quoted for illustrative purposes merely.

[2] For classifications embodying some of these processes, especially intellectual and social and moral attitudes, see Warren, *op. cit.*, 370.

[3] *Op. cit.*, 367.

1. *Expressive*

Attitude	*Emotion*
Cheerful	Joy
Despondent	Grief
Dazed	Shock
Frivolous	Mirth
Zealous	Ecstasy
Erratic	Restiveness
Romantic	Exuberance
Devout	Wonder

2. *Reproductive*

Attitude	*Emotion*
Affectionate	Love
Lascivious	Lust
Jealous	Jealousy
Motherly	Tenderness

3. *Defensive*

Attitude	*Emotion*
Cowardly	Fear
Courageous	"
Aversion	Disgust
Cautious	Timidity
Reserved	Shame
Servile	Awe

4. *Aggressive*

Attitude	*Emotion*
Hostile	Anger
Vindictive	Hatred
Malicious	Envy
Ambitious	Pride
Arrogant	"
Bold	Exultation

5. *Social*

Attitude	*Emotion*
Devoted	Affection
Friendly	Cordiality
Compassionate	Pity
Attachment }	{ Gratitude
Loyal }	{ Admiration
Antagonistic	Detestation
Sullen	Revenge
Distrustful	Suspicion
Supercilious	Scorn

6. *Instinctive and Sentimental*

Attitude	*Basis*
Miserly (Avaricious)	Acquiring Instinct
Orderly	Cleanliness
Nomadic	Wandering Instinct
Credulous	Belief
Skeptical	Disbelief
Perplexed	Doubt
Biased	Belief and Disbelief

Practically all conscious attitudes will possess, not only recognitive elements, but also affective correlates. Only the abstract scientist or philosopher can detach himself from a feeling of consequences or affective values which relate either directly or indirectly to himself or to those dear to him, and not even he can achieve such detachment all the time. For the great mass of mankind self-consciousness dominates social consciousness in a recognitive situation and emotion arises in connection with the perception of self in the situation. Even when these perceptions are sublimated into social consciousness, or when we are observing external relationships of cause

and effect objectively and in a detached manner, feeling may enter in according to the laws of feeling correlation, and sublimated emotions appear in consciousness. But where attitudes are concerned the self or self-consciousness is necessarily prominent and emotions attach strongly to this recognition of the self in relation to other objects. Also, since an attitude is fundamentally a suspended activity process, or a condition of preparedness for action, the absence of emotion of some sort is practically inconceivable in connection with a conscious attitude.

So many classifications of emotions and sentiments have been presented in this chapter primarily for the purpose of illustrating the lack of uniformity of treatment, on the one hand, and the lack of agreement as to the classification to which different processes belong, on the other hand. Thus, for example, McDougall lists affection as a sentiment, while Warren classifies it as an emotion. Warren means by sentiment something quite different from what McDougall understands by the term and other writers similarly. The cause of this confusion and lack of agreement is, apparently, the fact that psychology was developed as a form of logic before it was made the science of behavior. As a consequence, in its anxiety to understand human conduct and human attitudes, it refined logical distinctions on an a priori basis to a very great degree, without having the technique for testing out these logical distinctions and a priori classifications by reference to the actual physiological and neurological facts. Now that the science of human behavior has arrived, with its examination of neurological and physiological bases of action and mental behavior, the logical dress which it has inherited from the old methaphysical psychology does not fit very well. Not only is it ill-fitting, but it is also excessive in amount.

In the logical and metaphysical stage of the development of any discipline, lack of accuracy and functional adaptation

is in a manner compensated for by excessive refinement of descriptive classification. The scholastic attitude develops within it and the lack of functional understanding is to a degree hidden by the wordiness and refinement of logic. One of the first results of the invasion of a discipline or control situation by science, with the consequent displacement of metaphysics, is simplification. As a consequence understanding improves. This is what is happening in psychology, and soon a similar movement must take place in sociology. Much of the overlapping and confusion in terminology which we have found and exhibited in this chapter on emotion will disappear when we accept a neurological basis of discussion and reclassify our phenomena accordingly. Much can now be done to bring understanding out of confusion if we keep constantly and clearly in mind the distinction between instinct and habit and thus eliminate the many superstitions about instinct which we inherited from metaphysics. Also, if we remember that attitude is a general term for suspended activity, and that in its conscious aspects it must be either intellectual or emotional, another chief source of confusion will be avoided, especially the one which regards attitude as a subdivision of emotion or rational thought. Also we must keep in mind the fact that emotions are composites or complexes of feeling and sensory or cognition elements, and not independent or inherited mental elements. Also, that feelings and sensory processes are not logical concepts but neural correlates, and that out of the latter develop the vast complexes of intellectual content. And, finally, it is necessary to recognize that sentiments are but more highly developed and organized emotions, in which the object of the emotion is recognized as having a negative or positive feeling or welfare value for the subject. On the basis of these neuro-psychic facts we may rebuild our classifications without overlapping and remove the confusion which we have inherited from the metaphysics of

logic which has so long served in the place of a behavioristic psychology.

Desire is a term which occurs so frequently in the literature—especially in the literature of sociology—and the mental attitude of desire is supposed to play so large a rôle in the mediation of adjustments, that it requires some definition in behavioristic and neurological terms. Desire is an attitude with a large emotional content or correlate. It is the recognition of an object, which is not possessed, as desirable, that is, as an object whose possession or imminence would give pleasure or satisfaction. In the same way aversion is the recognition that the possession of or close functional contact with an object would cause unpleasantness to the subject. Desire and aversion are conscious attitudes. The object desired may be a commodity or an activity experience, knowledge, or anything which can be identified with the subject.

The consciousness of desire, on its recognitive side, arises from the readiness of the organism for the adjustment which has not been made. This unsatisfied readiness of the organism produces only a poorly defined emotional disturbance, such as restlessness, nervousness, irritability, vague unhappiness, etc., if the organism has not before had the experience of satisfaction. Such often is the case where sex tendencies are repressed at puberty without giving them some direct or indirect and sublimated avenue of expression. But where there has been previous experience of satisfaction, the readiness of the organism for the satisfaction is recognized in terms of a consciousness of the process of satisfaction, which may be pictured in elaborate detail, if the inhibition of satisfaction continues sufficiently long. This is the recognition content of desire. Neurologically the picturing of the process of satisfaction is practically identical with the inner or neural aspect of the completed act, if the overt part of the action could also

be established. That is, the organism, in attempting satisfaction, initiates the first part of the act neurally, or in consciousness (it is all the more conscious because the neural process is not completed by overt response), and this consciousness without the completion, which is inhibited, is called desire. Not infrequently, where a successful completion of the overt phase of the act cannot be secured, the inner neural or conscious part is repeated over and over again and it becomes an end in itself. This is a pathological condition which sometimes reaches the magnitude of a major psychosis or insanity, as in dementia præcox, just as an abnormal substitution of anticipation consciousness in aversion may also result in such insanities as the phobias or possibly even paranoia.

Neurologically, under normal conditions of expression, desire is not so much the cause of an adjustment recognized as "desirable" as it is the conscious correlate of the attempt of the organism to achieve the "desired" adaptation by initiating the inner or neural stages of the adjustment act or series of acts. Desire has both its instinctive and acquired neural correlates. To speak of instinctive desire is misleading, for desire never appears, as will readily be seen from the previous discussion, if the instinctive mechanism is really successful in making an adjustment between subject and object. It is only when the instinctive readiness of the organism, or the inherited action pattern, fails to function successfully that desire arises. Desire indicates interruption, not fulfillment. Hence, desire correlates more particularly with acquired activity; but it may have an instinctive basis. That is, the desire may be in part the conscious correlate of the instinctive neural mechanism attempting to go into overt action. But there is always more than just this neural basis of instinctive origin. There is also the consciousness of effort, of things to be overcome, of a technique of overcoming, which has as its neural correlate the modifications of the instinctive process by outside interference.

That is to say, most of the conscious content of the desire recognition has a modified or acquired neural basis. And this is also the explanation of the fact that in desire there is an undercurrent of unpleasantness along with the dominant feeling tone of pleasantness. There is interruption by modification, a secondary interruption, but the modification of the neural processes is a successful one—at least in the imagination.

Sentiment is somewhat under a shadow, according to the dominant categories of good taste, at least that exaggeration of sentiment which we call sentimentality. And yet sentiment of a sincere and properly chastened sort—sublimated and intellectualized—is one of the most valuable indicators of normality of adjustment or of attitude. It is the highest possible form of emotion, unless we account as emotion the almost intellectual appraisal of the beautiful and good or of the harmful and ugly, in which the subject practically detaches himself affectively from the object.

Too frequently we speak of the higher or more sublimated emotions and sentiments as if they always had a pleasant feeling tone. This is a mistake. Some of the strongest sentiments and emotions are unpleasant, even when of a high order. Such, for example, were the emotions of the ancient Hebrew prophets who agonized over the superficiality and perverted ideals of their people, or of Jesus on the Mount of Olives, and such might be the attitude of a modern moral leader who had some interest greater than filling successfully a well-paid position. The true patriot, in contrast with the professional optimist and the politician, will find much to suffer as well as to enjoy from his devotion to the highest ideals for his country and his civilization. The cynic is often not a bad man, but a man too good for his age, at least for the masses of mankind to understand and to profit by.

The conclusions reached in this and the preceding chapter concerning the nature and function of emotion may be stated briefly as follows: (1) Emotion is a composite concept and not an original and independent mental element. It is a varying synthesis of feeling tones and sensory elements of all grades of development from the lower visceral and other organic and peripheral pre-recognitive sensory elements and complexes to the cortically assembled recognitive processes built out of sensory elements as standardized percepts and concepts, under the general direction of environmental pressures.

(2) At one extreme emotion is resolved into feeling and simple sensory elements and complexes. At this extreme we have the primitive or so-called lower animal emotions. At the other extreme the higher recognitive elements and the feelings arising from their operation may dominate, especially in the so-called higher or human emotions. With the superior development of the recognitive elements the emotional evaluation and adjustment merges into rational adjustment.

(3) Emotions are not the fixed or inherited conscious correlates of the instincts, as McDougall has supposed. They are, in part, conscious correlates of the modified processes which arise from interruption of previous neural sets and complexes. They also arise from the random sensory disturbances caused by overflow of energy and impulse resulting from interruption or inhibition of dominant neural and activity processes, more especially when this interruption arises from the outside. Thus emotion is seen to belong rather to the field of acquired than of inherited neuro-psychic organization and technique.

(4) The emotions are as variable and possess as much acquired content as the habit and value complexes which have so often been miscalled instincts. However, they are not identical with these acquired complexes, nor are they strictly their conscious affective correlates. The correlation of the emotions extends beyond the dominant activity or thought adjustment

processes into the field of random activity or sensorimotor discharge. Emotions, like all other forms of consciousness, indicate inhibition or delay or modification of action instead of being the correlates of uninterrupted activity, which has a minimum of conscious correlation.

(5) The classification of the emotions is relative to the type of content, and there may be an almost infinite variety of terms, especially in the higher or human sublimated types of emotions. We cannot classify emotions effectively on the basis of inherited or acquired elements, but best on the basis of the types of adjustment being mediated as indicated by the content. Thus the emotion varies primarily according to the changes in the recognitive element, especially of the higher or perceptual and conceptual kinds. The relatively fixed elements in emotion are the lower and relatively undifferentiated and non-recognitive elements and the feeling elements correlated with the exercise of these.

(6) If we are to speak of primary and secondary or derivative emotions, the distinction should be made on the basis of the degree to which the relatively primitive and fixed elements become sublimated and intellectualized through the development and differentiation of the recognitive elements. While the elements which enter into the more primitive and primary emotions have more of an instinctive basis than have those of the derivative emotions, there is no emotion, however primitive or primary, which in its organized expression is purely instinctive. The so-called primary emotions of the classifications are, like the corresponding so-called instincts, complexes, and are consequently derivative in character, that is, they are organized under the control of environmental pressures.

(7) Sentiments are merely emotions in which the recognitive element is more highly developed, especially with reference to the value of the object for the subject. Sentiments therefore generally fall within the range of the higher or more sublimated

and intellectualized emotions, and the quality of the sentiment is a fair indication of the quality of the adjustment being made or of the attitudes toward objects, or situations.

(8) Attitude is the most general term indicating suspended action or the preparedness of the organism for action; it is not a sub-category of emotion or of rational adjustment, as is sometimes claimed. It includes such terms as instinct, habit, emotion, sentiment and desire.

(9) Desire is the conscious correlate of the neural activation which occurs when an organism is ready for action but is prevented from achieving the "desired" adjustment by some factor in the situation. The correlation is not alone with the previously prepared neural activity set, but also with the neural extensions innervated by the interruption or inhibition. Hence desire includes the recognition of both the adjustment desired and of the obstacles to be overcome, as well as the feeling correlations arising from anticipated success or failure. Aversion is a corresponding conscious correlate of an activity recognized as undesirable. Desire is not so much a cause as an indication of the value of a suspended response.

(10) The discussion of emotion in its various aspects, as well as of other attitudes, has been confused by the abundance of terminology which does not fit the facts. This confusion of terminology has arisen from the attempt to analyze the conduct of the "mind" on a logical basis before behavior had been studied from a neurological and physiological standpoint. A proper study of behavior and classification of terms descriptive of that behavior must start from a neuro-psychic basis and disregard the old logical metaphysical classifications where they are in conflict. The result of a behavioristic study, as is always the case where science is substituted for metaphysics, will be a great simplification of terminology and facilitation of effective thinking.

(11) Emotion is not the cause of activity, as is so frequently

assumed, but one method of evaluating the suspended or inhibited activity for the organism or society. The most primitive form of evaluation is feeling. Feeling proving inadequate as a method of mediating the more complex adjustments of a highly differentiated organism to a rapidly changing environment, emotion appears as a union of feeling and sensory elements. The sensory aspect of emotion constantly develops in complexity and effectiveness, because of the multitude of combinations of technic processes of measurement with objective reference which it can develop in the form of perceptions. In its conceptual form the recognitive element becomes dominant in valuing and mediating adjustments and these are spoken of as rational. The evolution of evaluative and adjustment technique appears to be away from instinct and feeling towards rational or conceptual methods.

CHAPTER XX

SUMMARY AND CONCLUSIONS

There is sufficient agreement at the present time as to the meaning of instinct to permit of a definition. Practically all English-speaking psychologists reject the continental practice of considering it as merely any automatic action-pattern, whether acquired or inherited, and limit it to those definite stimulus-response processes or action-patterns which are inherited. This limitation to hereditary action-patterns is not, of course, identical with the term "inborn" processes. The point of birth is nine months subsequent to the point of fertilization, at which the combination of hereditary characters takes place in the individual beginning life. During this intervening period many traits, which appear as automatisms at birth or for which the groundwork is then laid, are acquired. An instinct is not only an inherited action-pattern, but, in so far as it is a completely organized instinct, it is also definite. It is a specific response to a specific stimulus or set of stimuli. One cannot inherit an abstraction. Inheritance is either of concrete organs or tissues or of combinations of such, that is, of structures which determine the patterns of actions which inevitably proceed from them under unmodified conditions. These patterns of action, thus determined by the inherited organization of structures, we call instincts. Strictly speaking, one cannot inherit activities, but one may inherit the structure, the functioning of which determines the action-pattern. This is our justification for speaking of the inheritance of instinct.

But action-patterns can also be determined by acquired

organization and functioning of structures. Practically all of the skills are such acquired or synthetic organizations of structure, functioning in different or more complex ways than those to which inheritance directed them. Where such acquired or superinduced organizations of structures and functions occur and become automatic we speak of habit instead of instinct. Such modification of the organization of inherited structures, creating acquired action-patterns or habits, occurs but slightly or seldom among the highly standardized basic structures of the human organism. In the bony structures it occurs directly scarcely at all, although the skillful surgeon may accomplish something here by way of modifications. Likewise in the visceral and glandular tissues and structures there is relatively little modification of functional organizations throughout life, although there are exceptions to this statement. The digestive system, for example, may adapt itself successively to different foods or even in extreme cases to narcotics and poisons with a high degree of success, and the glands are probably constantly undergoing minor and sometimes major changes in structure and function in disease or as a means to protecting the whole organism against a dangerous infection or a condition of strain. Other visceral functions and the structural organizations upon which they are based, such as breathing and the circulation of the blood and to a less degree the functions connected with sex, remain pretty constant throughout life. Consequently, we rightly regard these fundamental structural and functional organizations, which remain much or wholly the same throughout the life period and which are so basic to the life of the individual and the species, as mainly instinctive. They retain their inherited form with a minimum of change until the death of the individual.

But when we consider some of the more flexible and phylogenetically less basic structures and tissues of the body we

find that they undergo a considerable modification of general structural and functional organization with the passage of time, and particularly in the first years of life, including the prenatal period of development. Even the minor and peripheral neuro-muscular controls—not those most basic to the evolution and survival of the type, such as those of the heart and those used in breathing—undergo a considerable modification in their collective or functional structural organization. We are born with few skills in the neural structures which control these peripheral muscles, probably largely because of our long history of parental care through a prolonged period of infancy; but we acquire a vast multitude of such skills or functional organizations and adaptations of structures under the pressures of modern civilization or the complex social environment which we call civilization. These acquired skills —although they may have instinctive foundations of a rudimentary and often imperceptible sort—are properly called habits. The historical process of evolution, out of which the instincts developed by means of natural selection, had no need of such skills, and they were consequently not selected into the organism by heredity. But our multiplied problems of organic adjustment to the physical environment, which is constantly differentiated into ever-increasing complexity through the medium of our expanding social environment, calls for a vast mass of neuro-muscular technique which may continue in operation for only a few generations or even decades but which must be spread abroad throughout the population almost simultaneously. Consequently these skills cannot by any manipulation of Mendelian inheritance be made to appear and become generalized throughout society through heredity. They must be acquired; they are habits.

An even more flexible part of the organism which lends itself to the formation of an infinite number of acquired functional organizations of structure is the brain. It would seem that

the chief function of the flexible brain is to provide an organism, which has become fairly definitely set in its fundamental or basic vital and visceral structural organizations and can no longer modify them easily to fit new and ephemeral environmental conditions, with a mechanism for making multitudinous and rapid and, especially, most intimate and detailed adjustments to a highly complex and kaleidoscopic environment, such as is created in and by the development of a social or rational world. For this reason the brain is the least set or permanently organized portion of the organism. Our neural stimulus-response processes or action-patterns are connected up after the point of fertilization, that is, after our heredity is organized or predetermined; and billions of these connections remain to be made even after birth. Even though we recognize the fact that vast numbers of these neural connections are made in carrying into effect the hereditary organization of the newly organized life cell at the point of fertilization, we must also recogniże that, as soon as the environment begins to operate upon the growing organization of cells which constitute this new individual, the inherited adaptations begin to be modified and new connections are increasingly made to carry the environmental pressures or determiners into effect in action as the power and complexity of the environment increase for the individual. At the point where the environment has multiplied most largely its direct effects upon the individual, where he has established with it direct contacts through the media of language, custom, tradition, public opinion and the acquired muscular adaptations to his physical world, the influence of the hereditary determiners has become more and more indirect because their operation has been increasingly and repeatedly modified by interrupting environmental factors which build up substitute or modified neural response process connections in the cortex. Thus the brain, with its billions of neurons and the almost unlimited opportunity for acquired

action-pattern or thought-pattern connections or combinations to be made within the cortex, becomes the chief region for habit formations. Here least of all—if at all—do we find developed the instinctive form of action-pattern.

The theory of innate or inherited ideas or images has been abandoned and relegated to the poetry of the mystics. Ideas and images are the product of acquired functional organizations of neural structures or habits. Likewise our social and ethical ideals or values are the result of such acquired organization. These last differ from ideas only in the complexity of the functional neural organization, permitting of a comparison and contrast of idea and imaginal units within the valuational complexes which we call social and ethical. To speak of instinctive ideas is manifestly absurd. To call ideals or social and ethical values, negative or positive, such as goodness, criminality, democracy, or conservatism, instinctive or inherited is therefore manifestly unjustifiable. Such an employment of instinct can persist only among those who have not yet analyzed the processes by which action-patterns are built up. The fundamental problem of the social sciences, which have grown out of the attempt to adjust man to his social environments, is therefore to work out the mechanisms by which new and non-instinctive action and thought-patterns are built up to mediate these adjustments of man to the social environment which the social sciences undertake to control. Such a problem is urgent in order that those who are working in these subjects may not go further afield in search of false but seductive leads.

There are various forms of the misuse of instinct in the social sciences. The most serious confusion, however, is the one mentioned in the preceding paragraphs, where the functioning automatism is not distinguished as to origin, any relatively fixed or definite action-pattern being pronounced an instinct

whether it is acquired or inherited. If all that the writer or reader means to convey by such an employment of the term instinct (as seems to be the case with some continental and a few American writers) is that the act is performed without reflection or consciousness of purpose or previous plan, little harm will in most cases be done. For example, if by saying that people are "instinctively protectionists" [1] or by speaking of "instinctive truth-telling" [2] the writers mean that certain people are protectionists or truth-tellers by habit, and if the reader understands such to be the sense of the expressions, it cannot be said that harm is done, although little may be gained in the way of closer definition of subject-matter or technique from such indefinite employment of the term. However, the writer often confuses both himself and the reader by such vagueness of speaking, for he may at one time mean only to emphasize the automatic character of the act and at another he may fall back upon the recognized or approved meaning of the term, implying that the automatism is an inherited action-pattern. Especially is there such danger of confusion to both reader and writer in the latter of the two expressions above and in such expressions as "instinctive regard for law," [3] or "the instinctive conservatism of the propertied," [4] or this striking instance: "Jefferson's instinct to keep the government close to the people." [5] These are functional qualities, based upon highly complex organizations of acquired neural connections or structures and cannot be inherited, but must be acquired from experience. Yet it would be easy to cite several thousand similar instances of confusion in the employment of this term from a collection made by the author.

This vague employment of the term instinct finds its logical

[1] Taussig, *Principles of Economics*, I, 513; II, 267.
[2] Ellwood, *Sociology in its Psychological Aspects*, 223.
[3] W. Wilson, *Division and Reunion*, 172.
[4] E. A. Ross, *Principles of Sociology*, 506.
[5] F. B. Vrooman, *The New Politics*, 243.

reductio ad absurdum in the application of the term to well-developed habit complexes, such as the "instincts" listed in the classification in McDougall's *Introduction to Social Psychology* and the various books on educational psychology of recent years. The most cursory analysis of the origin of the action-patterns involved in such so-called instincts as the parental instinct, reproductive instinct, fighting instinct, instinct of self-preservation, the gregarious instinct, and the like, will show that by far the greater part of the action content is acquired. Most of what a parent does for a child is the product of racial or individual experience and therefore belongs to the category of acquired habit rather than to that of inheritance or instinct. The same is true of the content of the other so-called instincts mentioned in this paragraph. To characterize such habit complexes as instincts implies either the abandonment of the accepted and desirable definition of instinct as stated above or a failure to analyze the structure of the acts involved. An instinct, since it is as much a unit character as any other product of Mendelian inheritance, is inconceivable apart from the fact of its structure.

However, there are many, psychologists as well as social scientists and others, who do think of the term instinct in such a vague and indefinite manner. They look upon it as a mystical something, variously denominating it as a "tendency" or "urge" or "motor impulse" or "quality of the act," etc. Their thinking is metaphysical and animistic rather than scientific. They have either come to the social and mental sciences by the way of the vague and resonant categories of metaphysics and a priori logic and have remained untouched by the biological foundations of these sciences which they profess, or they have failed to grasp the true significance of the Mendelian theory for the social and mental sciences as well as for biology. Those who would admit that the total set of acts included under the terms "fighting" or "self-preservation," as applied

to modern activities in the world, are predominantly acquired rather than inherited may still erroneously believe that such a set of acts is instinctive because it is the result of some undefined "tendency" to act in that way. Or they may claim that the habit complexes, such as "fighting" or "self-preservation," have original instinctive "cores." Or they may believe, with McDougall, that the habit complex is developed around an emotion and its derivative sentiments and that the emotion is the central and unchanging element of the original instinct from which the act takes its name.[1] Or, finally, the writer may have no clearly defined notion of how he may justify calling a habit complex an instinct but he "feels" that the habit complex is "dominated by" instincts or "grows out of instincts."

This claim that the habit complex, often miscalled instinct, is dominated by instinct in its formation will be examined in a later paragraph. The other assertion, that the habit complex is built upon an instinctive foundation, is of course in some sense always true, for all acquired action-patterns must grow up as the differential phase or superstructure of inherited capacities and activity bases. But such a relationship of derivation, often very indirect and highly derivative, by no means argues an identity; nor would it be worth while asserting this fact if the contrary were not so often urged in good faith and with all seriousness. The argument for calling an acquired complex an instinct on the ground that there is a "tendency" to act in that way reduces upon analysis to the same proposition. A "tendency" which is not a purely metaphysical and mystical adumbration must clearly be a neural disposition or set of neural processes. Such a neural disposition, if inherited, can be no more than the instinctive basis of the habit complex, often quite minute and remote and therefore frequently un-

[1] *Op. cit.*, 33, 46.

recognizable in the final complex acquired activity organization. Most of those who explain the leap from real instincts to pseudo-instincts or habit complexes on the basis of an imputed "tendency" are merely mystics. The others have not yet analyzed their proposition to its logical consequences.

The argument in support of the "core" is essentially of the same character, unless indeed it resolves itself into that of the central emotion or the argument of dominance of the habit complex under the influence of a powerful constituent instinct. An example of this last type of argument may be found in the justification of the employment of the term "reproductive instinct" (really a complex of instincts and acquired habits) on the ground that the complex is formed under the dominance of the powerful "sex instinct," which also is—as ordinarily used—a complex of various sex instincts and habits in which the truly instinctive maturation and expulsion of the seminal fluid by the male and equally instinctive action of the uterus and ovaries in the female may possibly be regarded as central if not dominant in the complex process. But there is vastly more to reproduction than these acts, and these acts may take place without resulting in reproduction. The so-called "maternal instinct" may be taken as an example of the former assumption regarding the "core." Here, following McDougall and others, the "tender" emotion is central and dominant and is characteristic of the "maternal instinct," hence it builds up around itself all those acquired activities into a child-caring complex which are necessary to its satisfaction. This argument would seem to be equally mystical. This "instinct," with its unchanging central emotion, is purely an assumption and is not defined at all by McDougall in terms of its original structure (as all instincts must be defined), but rather in terms of its highly sophisticated functioning in everyday civilized life. This amounts to defining a hypothecated instinct and accompanying emotion in terms of its modified

expression in use under the pressures of a highly artificial environment, a procedure which is just the reverse of the accepted methods of inductive generalization. It is nothing less than mystical apriorism.

The assumption of an original and unchanging characteristic central emotion as the essential attribute of the instinct, is itself without foundation in the data. The fact is that every action-pattern which fails to function with perfect automaticity develops some sort of emotion or other mental expression which is more or less characteristic of the act performed or attempted. But a purely instinctive action-pattern, functioning without interruption or hindrance, should develop no consciousness and therefore should be without a characteristic emotion such as McDougall insists upon. However, when inherited action-pattern or instinctive functional organization does not work smoothly because of the interrupting pressures of the environments—and in our modern complex civilized world, where the environment modifies and dominates practically every original tendency, it is probably impossible for any instinct to function with complete automaticity—consciousness, including emotion, enters into the process in proportion as the original activity process is interrupted or distorted by environmental pressures. Consequently, the less instinctive an act is the more emotion or other mental expression it is likely to develop. The complex habit dispositions should therefore have more emotional content than any constituent instinctive element, or, for that matter, than any constituent well established acquired automatism. If the quantity of the emotion is determined by the degree of environmental interruption or the necessity of making an adjustment in process of expression, the quality of the emotion is equally determined by the functional content or direction of the emotion, that is, by the character of the acts performed. It is not necessary that these acts be instinctive in origin. In fact, the genesis of the act,

whether inherited or acquired, has nothing to do with the determination of the quality of the emotion. The structure and the quality of an action-pattern, provided it mediates the same adjustment process, remain unchanged regardless of whether the action-pattern is inherited or acquired. Habits and instincts do not necessarily differ in mechanism, except where they are organized in the service of different functions, nor do they differ in degree of automaticity, except where environmental pressures bear upon them with different degrees of intensity, which are causes of variation wholly apart from the nature of the action-patterns themselves. They differ essentially only in their origins. The quality of the emotion, which is the sign of interrupted adjustment, is characterized by the nature of the action and not by the origin of the action-pattern with which it is connected. These conclusions would lead us to deny McDougall's assumption that a habit complex is an instinct or the creation of an instinct because of a central characteristic emotion, and to affirm, following the James-Lange theory of emotion in its main outlines, that the emotion springs up essentially in the process of the modification of an act and proceeds from the process instead of creating it. It is the result of the weakening of an instinct rather than of its dominance.

This line of argument leads us to deny some further implications of certain highly sophisticated types of definitions of instinct. For example, the claim of some authors that instinct involves a conscious element is clearly untenable. Such writers have lost sight of instinct as it appears in its purest form in the lower animals. Among men the instincts have become largely distorted by the lengthening period of infancy and by man's increasing susceptibility, through his highly flexible cortical processes, to environmental influences—most of which he has himself accumulated as social habits through a long period of

social evolution—with the result that many of the instincts which function intact in the lower animals are merely vestigial in man or have become broken up and detached from their former places in the developmental process as a whole and reattached to some particular section or aspect of it. The result is that man has come to be primarily dependent upon his social environment for guidance in the building of his action-patterns, and, since that environment changes constantly and rapidly, it is inevitable that there is a large element of consciousness in most human acts which are at all complex in character. The failure to recognize these facts, of the vestigial or delayed character of many human instincts and of the large element of consciousness necessarily involved in human conduct, is alone responsible for the inclusion of consciousness of stimulus and of end in the definition of instinct.

No more is it proper to speak of purposiveness as essentially characteristic of instinct. We popularly regard any activity which serves to adjust the organism to its environment as purposive. If consciousness of the end enters into the act the reputed purposive character is even more evident. What we really mean is that the act is functional. The popular attribution of purpose is in no sense dependent upon the origin of the act. As with the emotional content, the sense of purpose is dependent alone upon the functional nature of the act. Consciousness of the end being characteristic of the most highly developed purposiveness in action, we may say on the basis of our previous argument that habit adjustment or acquired action patterns have a higher degree of purposiveness than have instinctive acts. Similarly erroneous is the claim [1] that instinct is to be defined in terms of the function of the act. The function of the act has no necessary relation to its origin. All acts have some functional significance in the scheme of things.

[1] Pillsbury, *op. cit.*, 422 ff.

Nor does the fact that an act is pleasurable [1] signify that it is instinctive in origin. Investigations into the neural correlates of feeling show conclusively that feeling is the function of the organization of the act and not of its origin, except in the negative sense that instinctive acts would not normally be unpleasant under natural conditions. But under the artificial conditions of civilization they may easily give rise to unpleasantness, while acquired action-processes are often the sources of the highest, if not of the intensest, pleasures.[2]

So much for the analysis of the current misconceptions of the nature of instinct. In this discussion it has been pertinent to refer to the psychologists almost as often as to the social scientists, which is fitting, because the latter have largely copied their understanding of instinct from the former. In fact, both groups fell into their error about instinct quite naturally as a result of the old biology which was dominant at the time most of the authorities on instinct received their "set" in thinking on this matter. When they studied biology the theory of the inheritance of acquired characters had indeed received its deathblow at the hands of Weismann and others, but the new views had not yet so thoroughly permeated the backgrounds of their thinking, and of thinking in general, upon inheritance that they were enabled to divest themselves of the old preconceptions about what sorts of things are inheritable. Even when the Mendelian theory did become generally known in 1900 and in the decade following, it did not at once dissipate antagonistic ways of thinking. In fact it has by no means done so even yet. It is one thing to master a new theory and a very different matter to reorganize one's ideas and reclassify one's knowledge and preconceptions in

[1] *Ibid.*, 431, 441. Pillsbury makes this the criterion of an instinct.

[2] See Meyer, "The Nervous Correlate of Pleasantness and Unpleasantness," XV, *Psychol. Rev.*, 307 ff.; also Bernard, "Transition to an Objective Standard of Social Control," chs. 2 and 3.

keeping with it. Very few people ever do the latter with anything like adequacy, if they have already made a pretty thorough intellectual adjustment to a science before an epoch-making theory appears to transform it.

We are only beginning to square our psychology and our sociology, on their genetic sides, with Mendelian principles of heredity. The old theories of instinct are essentially Lamarckian and Galtonian in their biological reference, and they are metaphysically vitalistic in their accounts of derivation. The new theories of instinct, which recognize an instinct as a concretely definable unit character in the Mendelian sense, must be developed by students who come directly to the mental and social sciences with the Mendelian and Weismannian hypotheses and the newer biochemical and biophysical science, without the disturbing penumbra of the older views of heredity and metaphysical and vitalistic biology which have not been thoroughly extirpated from the thinking of the present generation of scientists.

Viewed in this light, activity complexes, such as were described above, can no longer be called instincts. Their acquired content becomes too obvious. The actual instincts are at once much simpler and more elemental and much more numerous than those set forth in the classifications of such writers as McDougall, Thorndike, Woodworth, and other psychologists. There are probably hundreds or even thousands (if we include the reflexes under the general heading of instinct) of these inherited mechanisms, mainly overlooked by the casual observer because they do not ordinarily function as independent units in adjustment processes but rather as constituent elements in larger habit complexes developed in response to environmental pressures.

It is true that these habit complexes are built upon these elementary and relatively minute instinctive bases, but it

does not necessarily follow that any particular habit complex is built directly upon any particular instinct or group of instincts. If we liken habit to a building which is reared upon a foundation constructed of stones corresponding to the instincts, we may compare various constituent habit complexes to the successive stories in a skyscraper. Some habit complexes are low down upon the bedrock of instinct and random activity and neural processes, while others are near the top of the building and have only very indirect contacts with the basic instinctive and random tendencies. It is also well to recognize that in our modern civilization these skyscrapers of habit are sometimes built very tall. Some men live lives which are relatively close to instinct, while other men build story after story of culture and sublimated interests until instinct is scarcely discernible in them in its original forms. Each successive story of habit formation is built upon the next story below and not upon the native instincts and random tendencies at the base, although even the most cultivated man may, under the stress of great crises or fear or illness, or other maladjustment, descend into the basement of the structure of his character and for a time live on a level with his instincts, forgetting his better and acquired nature.

Modern civilization is like a city of such skyscrapers. Organized into blocks and sections of this city, facing along certain streets, which we may liken to the avenues of custom and tradition, of public opinion and convention, and the like, they collectively constitute the tremendous social environment divided functionally, if not geographically, into institutions. As each new individual comes into the world he has much the same foundation as others have of native soil upon which to build, varied to be sure here and there by excavations, marsh land, hill, or stone; but whether this individual grows into a towering skyscraper, a dingy tenement house (like some erudite but confused scholars!) or is arrested in his development

as a shanty in the slums, depends not so much upon the character of the soil, as defined above, upon which the superstructure is reared, as upon the environment in which it grows. Just as the character of the building on lower Broadway will inevitably differ from that of the Bronx or Flatbush or Hoboken, or Gopher Prairie, so will the human character vary with and in response to the social environment, the native soil or instinct exercising a deciding influence only when its character is so markedly exceptional as to render the usual structure suited to that environment manifestly impossible.

While the above description is in the nature of an analogy rather than of an analysis of the concrete activity processes connected with the development of character, I believe the description is essentially true to the facts. The instincts are very early overlaid by acquired habits in the process of adapting the individual to his environment, and these habits are in turn overlaid by other tiers or stories of habit in which the native character of instinct ever constantly diminishes in proportion and intensity, until the child who has reached a rational age is reacting in nine-tenths or ninety-nine one-hundredths of his character directly to environment, and only in the slight residual fraction of his nature directly to instinct. The influence of environment is cumulative in our lives and the decline of the influence of instinct is progressive.

Other evidence that instinct does not dominate habit formation is to be found in the fact that the extension of the period of infancy in man has distorted the growth process so far as the instincts are concerned and has substituted to a large degree the active care of the mother for the guidance of instincts in the child's development. As a result, some of the instincts which function completely in the lower animals, such as walking and running and the making of definite movements connected with food-getting, have been rendered largely

vestigial by the substitution of the mother's providence. Other instincts, such as those of sex, have not been rendered vestigial but have been torn from their moorings in connection with the early stages of the growth process and have been attached to a particular stage of development further along. These may be called delayed instincts. The former class of instincts tend to drop out of the developmental process altogether, or to be broken up into their constituent reflexes which are now reorganized around other functional activity processes—mainly habit complexes,—or they are so modified by the developmental process, controlled by parents and community, that they never appear in their original forms or in complete maturity.

The same modification of the original action-pattern by environment happens, to a less degree, in the case of the delayed instincts. Already, before they appear, the organism has developed such a large complex of habit adjustments to the environment, which are so far in advance of the adjustments which the lower animal forms make to the environment, even after these instincts have appeared in the developmental process, that the now delayed instincts come into action in the higher life forms in combination with a different set of functioning activities from that to which historically they are adapted. Consequently they undergo modification, either in structure or in organization, from the inception of their development. Thus the sex instincts in man do not appear in an organism possessing simple and unsophisticated activities and without learned sex attitudes and moral preconceptions, as would be the case in life forms much lower in the developmental scale, but they begin to function in a being who has already a set of habit controls, especially adapted to his civilized environment, called " sex-morals." He has also learned a wide range of vocational and æsthetic activities which compete in the expenditure of energy and time with the sex im-

pulses. Also, and a matter of the greatest importance, this sophisticated animal has learned to wear clothes, which fact serves in numerous ways to inhibit—sometimes to intensify —the stimuli to the instinctive activities of sex. In this way the sex life has been conditioned, almost set, before the sex instincts appear. As a consequence, most of man's sex life is learned and is hemmed about with modifications and transformed with sublimations and perversions. Because the basic inherited physiological processes of sex—the true sex instincts —are necessary to the perpetuation of the race they remain intact instead of becoming vestigial, as is the case with instincts for which the acts of another can be substituted in the developmental process. But, none the less, their functioning—the extent of their exercise and the direction or application which they take (whether in adaptation to reproduction or to amusement or to more decided, even commercialized, perversions)— depends upon the controls—largely antedating their maturity —which have been developed in man's social environment. Even they, although intact in their elementary forms, do not control the environment of habit, except in a diminishing and minor degree, as civilization advances. The vestigial instincts control habit formation to even a less degree; are in fact being broken up by the accumulated force of environment functioning in their stead, better to meet the contingencies of an ever more complex and more rapidly changing world.

This view that instinct in the human type is being disintegrated by the encroachment of habit, aided by the vestigial and delayed character of many or most of the instincts, consequent upon the extension of the growth period and the substitution of parental care, may be objected to and the contrary argument advanced that man has more, rather than fewer, instincts than the lower animals. Such has often been

asserted [1] and recently definitely denied.[2] It seems very unlikely that the human animal is in process of acquiring new instincts; certainly not such complex ones as the less critical psychologists attribute to him. There are a number of significant facts which contradict such an assumption. In the first place, the mathematical laws of chance are against it. An instinct as complex as the "maternal" or "gregarious" or "intellectual" instinct, involving as it would in the aggregate some millions of neural connections or processes (for there must be at least as many neural dispositions for each of these class terms or "instincts" as there are ways or combinations of ways in which each of the groups of functions represented by these terms may be carried on), would appear as a spontaneous mutation (never, of course, as inheritance of acquired traits), with just the proper organization to fit the requirements of the environment of that particular time and the place, in some highly fortunate individual, only once in an age. The statistician would not expect to see such an instinct crop up in large numbers of the population in a single generation. Take, for example, the rather widespread abilities of the Italians to sing and to appreciate grand opera. Often these abilities are said to be inherited. They are extremely complex, consisting of a manifold technique of muscle, vocalization, symbolization, etc., in which perhaps tens of thousands of neural connections of a very definite order and organization are involved. It does not seem likely on the basis of the laws of chance that the highly complex ability or "instinct" to sing grand opera would appear spontaneously in so many thousands of Italians since 1600, whereas it had never appeared at all even among this musical people before that time. It seems much more likely that, living in a musical environment and aided by the inheritance of organic structures of the

[1] See William James, *Psychology*, ch. 24.
[2] See Miller, *The Psychology of Thinking*, 76–77.

inner ear which make pitch and tone discrimination easy for them, they have learned, instead of inherited, the highly complex content and technique of their art. If one can learn Greek or Sanscrit, although one has no Greek or Hindu blood in his veins, hence no conceivable heredity for these languages, might he not also learn grand opera, especially if the environment is favorable to this acquirement? Or, shall we suppose that only those who have a spontaneous mutation for Greek and Sanscrit and grand opera can learn these languages or execute this type of music? The proposition becomes absurd. Yet it is not unfair to the assumptions of those who speak of complex social instincts which consist of activity complexes unknown to earlier generations and which therefore must have been organized but recently. The so-called instincts of democracy (conceived as functioning in the modern socialized state), of fighting (when applied to modern scientific warfare), or of gregariousness (if meant to include the multifarious forms of modern intercourse) are examples in point. If we always remember that there can be no instinct apart from its structural and activity content, that it is never a mystical "entity," "tendency," "influence" or other indefinite mask for ignorance, but always a concrete reality, in the last analysis biological in its nature, there will be no occasion for supposing that such recently organized complex activities or highly fluid and changing classes of activities could appear as mutations in a great number of people in a short period of time, if at all.

But, for the sake of argument, let us suppose that a very few people might be blessed with a spontaneous mutation which gave them the power to execute grand opera, or any one of the complex "instincts" such as the recent social and educational psychologists impute to us. How could these complex abilities be generalized to the whole population? Certainly it could not be done in a single generation, nor in ten thousand generations. The organization of society, with its taboos on

race and class interbreeding, being such as it is and has been, it is doubtful if such traits could ever be disseminated throughout the human race. Certainly for slow-breeding man the time element would be prohibitive for the rapid dissemination of new traits by means of heredity. And yet, most of the present-day content of the complex "instincts," such as fighting, mother-care, gregariousness, self-preservation, and the like, is not very old. Very little human fighting, for example, is any longer of the character engaged in by lower animals, but involves the most complex technique of manipulation of firearms, poison gas, field guns, map-making, field tactics and parliamentary wrangles, to say nothing of the journalistic sideshows. All of this, if instinctive—and nothing is instinctive about an "instinct" if the concrete action content is not—must have been spread abroad throughout the world in a generation or two or three by biological inheritance! It would be remarkable, if true.

It will avail nothing to fall back upon a mystical interpretation of instinct, as a method of refuting these facts, claiming that it is the "central emotion" or the "tendency" which is inherited and that these come down from man's pre-human ancestors. This argument was exploded earlier in this discussion. An emotion is not a mystical entity, resting in some isolated corner of the brain, which dominates action much as the metaphysical or supernatural "free will" was formerly supposed to do. Emotion is correlated with and characterized by the whole act which comes into consciousness in any degree, through modification or inhibition and overflow, whether it is an instinctive or a habitual act. Or it may arise primarily from overflow of blocked impulses and have little resemblance either to the act inhibited or the one newly to be organized out of the interrupted processes. The isolated and unchanging central emotion of McDougall is a myth. Instinct is action according to a structural action-pattern or it is nothing. To

repeat, we do not inherit abstractions, but concrete biological organs and structures. Neither is our inheritance lateral, across generations from contemporary to contemporary, but longitudinal and differential, from generation to generation. Consequently we may conclude that if new instincts, complex and peculiar to man, were appearing they would not so quickly spread throughout the human race as they seem to do. Only acquired action-patterns can be disseminated in this way.

The demand of the accumulated complex social environment, which we call modern civilization, is for an organism with a maximum of variation of activity at a maximum of speed. Only with such capacity for change can man make the most of his powers and reap the largest reward from nature's resources and society's riches. Only with such powers can man be so ubiquitous, adapting himself to all climes in quick succession, living under all the conceivable conditions which his interests dictate. The insect has a narrow locus and dies in the same season in which it is born, or it makes the transition by means of metamorphosis. Its instincts are practically fixed. If man were solely a creature of instinct he too could not enjoy his vast range of adaptability. It is because his completer or progressive development demands ever greater flexibility of adaptation that he is shedding and dissolving his instincts as he evolves and substituting for them control through the growing and self-perfecting institutions of his social environment. Man is able to dispense with instinct because he has a highly complex and well organized social environment, and in so far as this environment is improved and becomes more adequately organized to meet his present and future needs it replaces his instincts in the evolutionary process of selection or it represses and transforms them in the progressive character development of the individual. For man to be accumulating new instincts instead of losing or re-

pressing and transforming old ones would work exactly contrary to his needs of adaptation to his increasingly complex and changing environment. The rate and mass and degree of change in this environment are already so great that his adaptations could not possibly be made on the basis of instinct alone or even primarily.

Are we not, then, in the light of these facts, forced to the conclusion that the complex social "instincts" are in reality aggregates of habits and instincts and reflexes, organized and reorganized from more elementary habits and simple constituent instincts and random movements, with reference to some specific function, the content constantly changing as the function and organization of the adjustment to be made vary? Although the content of the habit complex, miscalled instinct, varies constantly with the character of the adjustment, the aggregate of acts itself retains the same class name as long as it serves the same general function in society or for the individual. Thus, the habit complex tends to be named with reference to its function or according to its value—as maternal, gregarious, ethical, fighting—while the content varies infinitely, never consecutively possessing that unity of character which is essential to the concreteness of biological instinct. The class term for the group of fluid or changing acts is an abstraction representing ordinarily a social valuation or function, although it may also be named generically after the root type of structure to which it conforms. The explanation for calling the habit complex an instinct is sometimes the confusion of automaticity with inheritance and sometimes an inability to separate the total aggregate of activities from some prominent instinctive act which is included in it, or also an inability to distinguish function from structure in our thinking. Sometimes it is all of these. Such implied criteria are deceptive guides. Sometimes the resemblance between the total habit complex and the constituent or foundation instinct

is more symbolical than real. Sometimes it represents the continuation of a name long after the habit complex, through growth in content and changed adaptation to a new and socialized and civilized environment, has undergone a complete transformation of character and has lost its former resemblance to the instinct. This is markedly true of the so-called maternal instinct which, in content of activity in the human being, has only a few remnants of the original maternal instincts of lower animal types.

But there would be no conclusive objection to this misuse of instinct if it brought good results. Its results are not good, but disastrous. The method has so far been barren of aid either to the investigator, to the teacher or to the social reformer. The educational psychologies, like the social psychologies, start out with an elaborate analysis of the so-called instincts and then solemnly inform the reader that the task of the educator is to guide these instincts into fruitful development as a method of adjusting the child to life; that it is the function of the school to develop the instincts instead of repressing them. A recent text-book in this field [1] illustrates the point. The elaborate analysis of instinct in this work, however, is not followed by a fulfillment of its promise. Specific instincts are mentioned only a few times after the introductory chapters are passed, and in this respect the book is not exceptional. The process of applying the instincts to the living educative process turns out in most of these books to be a very general and vague one. And so it is in the social psychologies. The applications have little of the exactness which characterizes the definitions of instincts.[2]

[1] D. Starch, *Educational Psychology*.

[2] Compare in this respect the two volumes by McDougall: *Introduction to Social Psychology* and *The Group Mind*. The latter book is supposed to represent an application of the principles presented in the former, but comparatively slight use of instinct is made in it.

This inability in practice to make the development of the instincts fulfill the promise of the classification is not, however, a matter to occasion surprise. The social and educational psychologists have started to build their superstructures of individual character and social institutions upon too sophisticated and too unstable units. These units (supposed instincts) will not retain their form and character under the pressures of environment in the socializing process. Their contents are too fluid and indefinite. It will be necessary to divest the "instincts" or their acquired content and to reduce them to the most ultimate possible terms. Then the psychologist, the educator and the sociologist can begin to use them as building stones of character out of which to construct the foundations and part of the superstructures of social life. The exposure of the present incorrect usage of instinct should clear the field for a vastly more important labor of analysis in character and society building.

The real task before the social and educational psychologists with respect to instincts is to discover the mechanisms by means of which the child and the citizen build up their habits upon the basis of the instincts, directly or indirectly, and by means of which one habit or set of habits is transformed into another. Hitherto they have approached this problem from essentially the wrong angle, that of the analysis of instinct, on the assumption that instinct dominates the development of habit. Both the approach and the assumption are erroneous. The sociologist is demonstrating that the environment increasingly dominates both the content and the direction or functioning of habit formation.[1] It is, therefore, from the standpoint of the content and the organization of the psychosocial environment that the control of the growth of human character should be approached, the instincts being regarded primarily as the original—not necessarily the immediate

[1] L. L. Bernard, "Neuro-Psychic Technique," *Psy. Rev.*, Nov., 1923.

or the only—starting points in the process. But before this change in emphasis can be brought about the inadequacy of the theory of instinctive control must be made manifest through an exposure of the current radical misconceptions regarding the nature and content of the instincts. Many sociologists have been feeling their way toward this objective for some time. It is a task which of necessity falls to the sociologist, because only he has the data regarding social organization and social pressures in sufficient mass and detail to make the error of the biological group—generally quite uninformed regarding the complexity and dynamic character of the social environment—sufficiently evident. It is not too much to say that the future control of the human race and its civilization lies not through selective breeding of the higher social qualities—although selective breeding of those traits which can be so bred is of the greatest importance—but through their transmission by social contact and control.[1] The overwhelming—and generally the immediate—pressures upon the character-forming process, especially in its more advanced stages, come from the accumulated psycho-social environment.

[1] See H. W. Conn, *Social Heredity and So ial Evolution*, ch. 11.

INDEX

Abstract attitudes are conceptual, rather than structural, 305, 342, 343.
Abstractions not inherited, 509.
Abstract value complexes not neural units, 236, 385.
Acquired attitudes, 229, 287; control child-care complex, 338; survival value of, 229; vary in strength, 228.
Acquired characteristics, 224; noninheritance of, 232, 260–265, 311, 437.
Acquired control of reproduction, 289.
Acquired habit complex, 227, 228, 287.
Acquired mental technique, 441.
Acquired technique, 91 ff., 338, 339.
Acquired traits, 419; distinguished from inherited, 259, 262, 266, 297; more numerous than inherited, 222.
Acquisitive responses, 396.
Act, conditions of the, 309, 445–449; inherited, defined in terms of its organization, 313, 359; unity of, 359, 371.
Action, 38 ff.; categories vs. valuations, 128 ff. 146; of organism by segments, 445–449; of organism as a whole, 445–449; potential, 120.
Action patterns, 3, 4, 39 ff., 88 ff., 107ff., 331, 509, 510; Generality of repeated, 128 ff., 175.
Activities, stimulus-response, 188, 189.
Activity, acquired, 133; automatic, 133; habitual, 133; inherited, 133.
Activity complex, 290, 291, 356, 357.
Adaptability to environment, 88 ff., 95–99.
Adjusting mechanisms, 88 ff., 107 ff., 163 ff., 305.
Adjustment 95, 101 ff.; coöperative through language, 111; inner, 105, 109, 110; mechanisms, 88 ff., 109, 120, 354; mixed, 98, 100, 106; neural, 88 ff., 107, 109, 166; overt, 99 ff., 118, 228.
Adjustment complexes acquired, 354 ff.
Adjustment to environment, rapidity of change of human, 89 ff.
Adjustments, neuro-psychic, 87 ff.
Age of Enlightenment, 241.
Altruism, 359, 360.
Analogy, use of, by biologists, 442–445.
Anarchists, 241.
Ancestor worship, 225.
Angell, J. R., 68, 70, 73, 75.
Annoyers, original, 399.
Anthropology, 245.
Aristotle, 226, 239, 244, 366.
Arnold, Matthew, 241.
Associative memory, 49.
Atavism, theory of, 418.
Atomic theory of instincts, 445, 449; of sentiments, 489, 496.

Attitude, nature of, 496, 497, 507.
Attitudes, acquired, 229; classification of, 497–499; congenital, 219; inborn, 219; inherent, 219, 220; inherited, 219; innate, 219; instinctive, 27; native 219.
Automatisms, acquired mistaken for instinctive, 428, 429, 430, 442–444, 531; correlated with occupational interests, 429.
Autonomic nervous system, 44–47, 86.
Aversion, 502, 507.

Bach family, 432.
Bacon, Roger, 244.
Bagley, W. C., 68, 154.
Baldwin, J. M., 486.
Balking, evils of, 22.
Bandler, J. W., 43, 142.
Beerbohn, Max, 127.
Behavior, 10, 87; flexibility of man's 10; instinctive theory of, 240; science of, 500.
Behavioristic analysis, 367.
Behaviorists, 224.
Belief in God, 221 ff., in immortality, 221 ff., in the supernatural, 226, 227.
Bergson, H., 366.
Berman, L., 73, 74.
Bernhardi, General, 32.
Biologic character of instinct, 10 ff., 60 ff., 188, 226, 248–267, 305.
Biological determinism, 9, 31.
Biological errors concerning emotion, 454.
Biological interpretation, 243; dominance of, 222, 243–246; slow revision of, 16, 230, 521.
Biological limitations, 35, 251.
"Biological man", 240.
Biological tradition, 454.
Biological transmission, similarity to social transmission, 233–235.
Biological viewpoint, 8 ff., 139, 173, 230 ff.
Biologists, attitude toward sociologists, 11; bias of, 173; their complex regarding "environment", 12; error of, 443; their non-assimilation of the Mendelian theory of inheritance, 15 ff.; unpardonable sin of, 12; their use of the analogical method, 12, 18, 442–445.
Birth control, 290.
Boas, Franz, 293.
Born criminal, 306, 313.
"Boss," American, 431, 432.
Brain, 47 ff., 55, 301, 511; development of, 47 ff.
Breeding, early knowledge of its technique, 232; science of, concrete, 233.
Brill, A. A., 141.
British psychology, 62.

Categories, sources for action types, 146; sources for valuations of action and conduct, 146.
Cerebral control, 49 ff., 166, 301–303, 378, 446–9, 513.
Cerebral cortex, 48, 57, 351, 447.
Ceremonial practices, 224.
Character and sentiment, 485, 486.
Character complexes imposed by environmental pressures, 299, 314 ff.
Character organization, 369, 534.
Character traits largely recently acquired, 314.
Chemical theory of instinct, 73, 74.
Child-care complex, 290–292, 322–339; cultural source of, 334.
Child-care, conditions of, have changed, 335.

Child mind flexible, 351.
Chromosomes, 254 ff.
Cities, cause of growth of, 357, 358; gregariousness in, 358.
Civilization, 511, 523; and written language, 112.
Civilized society, 121.
Cold, responses to, 392.
Colvin, S. S., 68, 70, 74, 75, 143, 151, 154.
Communication, 91, 113, 299, 427.
Complex, criminality, 305 ff.; gregariousness, 357.
Complexes, 146, 305–415; are composite, 384–386, tendency of, to break up into constituent elements, 146, 357, 367, 401.
Complexity of modern group life, 89 ff., 233.
Comte, Auguste, 221, 366.
Conditional adaptation, 101; association, 96–100; development, 267, 268–304; development of maternal reflexes, 327, 335; response, 96–100, 372.
Conn, H. W., 14, 133, 134, 443.
Conscience, 241.
Conscious habit, 98 ff.
Consciousness and instinct, 74 ff., 81–83, 452, 453, 518; interrelation of self and social, 486.
Construction, relation to play, 353–357.
Contraceptive methods, 288.
Contract, freedom of, 242.
Control, through breeding, 233; conscious, 49 ff., 77, 422, 447–449; through education, 223; through environment, 89 ff., 232–235; through eugenics, 23, 232; psycho-social, 120; through science, 422; through slaughter, 223.
Control, social, 121, 422; externalization of, 119; through potential knowledge, 120; through science, 121.
Convention, 240, 427, 512, 523.
Conversational element in language, 107.
Conversational form of thinking, 107, 108.
Cooley, C. H., 131, 486.
"Core", as basis of instinctive control, 316 ff., 319, 326, 329–339, 344, 346.
Councilman, W. T., 230, 359.
Curtis, W. C., 443.
Custom, 226, 240, 427, 512, 523.
Cynic, 504.

Dante, 485.
Darwin, Charles, 243, 245, 269, 382.
Davenport, C. B., 14, 231, 305.
Death, causes of, 282, 283.
Democracy, 239–243.
Desire, and feeling, 504; not instinctive, 503; nature of, 502, 503, 507; neural basis of, 318, 319, 334–337, 503; recognition element in, 502; transformation of ends in, 503.
Desires are acquired, 503.
Determination of human conduct external, 119.
Determinism, 31; biological, 31; environmental, 31.
Development of human organism, diminishing ratio of, 279, 280.
Development of differential traits, 258, 268 ff.
Developmental stimuli, 257, 271, 273, 275.
Dicey, A. V., 130.
Disgust, similarity to fear, 391.
Dispositions, human, 498, 499.
Divine rights theory, 242.

Drever, J., 61.
Driesch, Hans, 366.
Drinking habits, 223.
Ductless glands, 271, 281.
Dunlap, Knight, 3, 7, 60.

Eating habits, 223.
Ecology, animal, 278.
"Economic man", 241.
Economists, 241.
Education and environment, 295 ff.
Education, modern ideal of, 117, 234, 235, 449; vs. breeding, 223.
Ellis, H., 327.
Ellwood, C. A., 128, 221, 226.
Emotion, 454–508; as a central "core" of instinct, 454, 456, 505, 517, 518, 529; confusion of with feeling, 463; as psychic correlates, 455–457; derivative, 479 ff.; has two dimensions, 455, 457; distinguished from thought 465, 467; environmental determination of, 508, 518; feeling element in, 455 ff., 475, 479, 491, 492, 505; and habit, 481–483; and illusion, 466; and inhibition, 457, 463–472, 508; inner unity of, 481–483, 493; not instinctive, 518; instinctivist theory of, 454–457; McDougall's theory of, 455, 556; nature of, 455–458, 463, 492, 493, 500, 501, 505; primarily a negative adjustment process, 464; not an original psychic element, 457, 464; a phase of mental life, 455; prerecognitive elements in, 455, 458; primary, 456, 479; recognitive content, 475–479, 481, 507, 508; sensory element in, 455, 458, 464, 470–472, 475, 476, 505; Shand's theory of, 454, 455; sublimation of, 480, 481, 504; variability of, 481–483, 505.
Emotion of anger, 473; of disgust, 391; of fear, 389, 390, 473.
Emotion as a unitary element in consciousness, 454 ff.
Emotional excess produces disgust, 478.
Emotional instability, 466, 470, 471, 503.
Emotions, aggressive, 473; ambivalence in, 478; assertive, 473; complex, 454; defensive, 473; derivative, 479–481, 506; differentiation of, by recognition, 476 ff.; overlapping of, 477, 478; primary, 479–481, 486, 489, 506; primitive, 479–481; regressive, 473; secondary, 479–481, 506; standardization of, 481–483, 490; transformation of, 477–479.
Emotions, classification of, 455, 473–476, 490–492, 499, 506; by conscious content, 475, 476, 479–481; by degree of complexity, 474, 479, 481, 484; by direction of activity, 473, 474; by feeling content, 473; by function, 473; by moral quality, 474; by overt activity correlations, 475; by social character, 474.
Endocrines, 257, 271, 273, 283, 438.
Endocrinologists, 73, 74, 142.
Energy expenditure, guidance of, 347.
Environment, abstractness of, 233; change of environment and intelligence, 89–90; complexity of, 9 ff., 48, 88, 93, 439, 440, 512, 531; dominance of, 23, 28 ff., 55, 58, 85, 121, 246, 328 ff.,

342–344, 347–364, 439, 444, 447–449, 533, 534; expansion of, 88 ff., 299, 328, 512, 530, 531, 534; extent of, 10, 88 ff.; importance of, 3–5, 17, 26 ff., 232–235, 302, 303; man's adaptability to, 88 ff., 93, 512; nature of, 59; operates selectively, 441; postnatal, 269, 282, 291, 301; preconceptual, 259, 267 ff.; prenatal, 230, 267, 268, 272, 282, 438, 511; prenatal confused with inheritance determination, 230, 438; psycho-social, 11, 13, 21, 42, 54, 58, 111, 119, 120, 121, 229, 246, 328, 342–344, 347–364, 439, 444, 447–449, 462, 511–513, 523, 524, 533, science of, 232–235, 439; study of, recent, 439; technique of adjustment to, 90–92; types of, 88, 462; uniformity of, for lower forms of life, 89.

Environmental conditioning, 268–304, 327, 333; control of heredity, 249, 255 ff., 274, 427; control increasing, 298; determination, 418; instability, 89 ff.; method of control, 24, 232–235, 333, similarity of, to control through heredity, 233–235; method of social improvement, 24; pressures, 76, 88–94, 233, 272 ff., 317, 345–364, 369, 444, 512, produce universality, 229, are transmitted laterally, 24, 233, 234, 315, 419, 528; theory, recency of, 224, 233–235; transformation of traits, 271, 292–295; transmission distinguished from hereditary transmission, 419–422.

Environmentalists, 30 ff., 54, 297, 450.

Error, sources of, with regard to instinct: doctrine of natural rights, 239; frequency of occurrence of activity, 221–229; uncritical assumption of inheritance, 230–238.

Evolution, doctrine of, 244; biological, 244, 444; social, 444.

Eugenics, 23, 231, 232, 245; conscious negative, 421; as a method of social control, 14, 23.

Eugenists, 442.

External storage of habit, 120 ff.

Externalization of institutions, 120.

Fear, similarity to disgust, 391.

Feeble-mindedness, 419, 423.

Feeding reflexes, 394.

Feeling compared with sensation as guide to adjustment, 459; confused with emotion, 463; nature of, 455, 458, 463; and neural correlation, 455, 460–463, 467–469; qualities of, 461, 462.

Feeling tones, 460.

Feldman, W. M., 15, 50, 230, 268, 270, 275, 280.

Fighting, as many forms of, as there are situations or causes of, 342; relation to construction, 355; relation to play, 352, 355.

Fourier, Chas., 241.

Freud, S., 12, 141.

Freudians, 22.

Galsworthy, John, 125, 128.

Galton, Francis, 522.

Gamble, F. W., 84, 85, 230, 249, 270, 276–278.

Geddes, Patrick, 417.

Giddings, F. H., 243.

Glandular secretions, 42, 257, 271, 273, 283, 438.

Gregariousness, 357, 358; in cities, 358; in country, 358.
Group life, early homogeneity of, 233; recent complexity of, 233.
Growth process, 256 ff., 268–304; diminishing ratio of, 279, 280.
Guthrie, E. R., 369, 376–378, 384, 391, 394, 396.
Guyer, M. F., 256, 262, 417; and Smith, 256.

Habit, central control of, 138; confused with instinct, 133, 139, 140, 221, 250, 451, 513, 516; distinguished from instinct, 3 ff., 18, 59; dominance of, 51 ff., 132, 511, 517; external storage of, 118; externalization of, 119, 120; importance of, 3–5; instinctive foundations of, 523, 534; internal, 98 ff.; mechanisms of, 102; mixed, 98 ff.; overt, 98 ff., 102, 118; potential, 118, 119; variability of, 88.
Habit adjustment, 85, 86, 95 ff., 102, 104, 118; acquired, 166; occurs before delayed instincts appear, 525; overt, 118.
Habit complex, acquired, 227, 228, 362–364, 426.
Habit complexes, and emotions, 482; mistaken for instincts, 128 ff., 157, 166, 227, 228, 284–292, 522.
Habit formation, 19, 52 ff., 78, 79, 88 ff., 95–99.
Habit storage, 115 ff.
Habits, delayed, 300; raw material of, 346, 347, 372; sources of, 347; of thinking, 351.
Hall, G. Stanley, 127, 150.
Hartley, David, 366.
Hayes, E. C., 134.
Heat, responses to, 392.
Helplessness of human infant, 85.
Henderson, W. D., 282, 283.
Helvetius, 366.
Herbartians, 119.
Herder, J. G., 366.
Hereditary traits, confused with acquired, 320, 401–403, 416; modification of, 260, 427.
Hereditary transmission, 419; confused with social transmission, 234, 235; distinguished from environmental transmission, 419–422.
Heredity, analogical use of term social, 235; conditioning of, 268–304; cytoplasmic influence in, 257; determination of, 255 ff.; environmental determination of, 249; importance of, compared with environment, 302, 303; and instinct, 248–267; mechanism of, 251 ff.; modification of, under environmental pressures, 249, 258 ff.; social, a misnomer, 235, 321; social and biological, difficult to distinguish, 321; statistical method of studying, 231; strictly a biological process, 236; uncritical notions of, 230–232.
Herrick, C. J., 4, 42, 43, 49, 50, 52, 53, 55, 57, 67, 77, 434, 435.
Herter, C. A., 444.
His, Wm., 280.
Hocking, W. E., 69, 135–140, 164–166, 378.
Holmes, S. J., 16, 71, 75, 433, 443.
Human behavior, science of, 500.
Human nature, 240, 242; breaking up concept of, 243.
Hume, David, 366.
Huxley, Julian S., 254, 255, 257.

Ideals, 513.
Immaturity of child at birth, 85, 326.
Individualization increasing, 298.
Infancy, prolongation of, 326, 444, 519, 524.
Inheritance, absorption theory of, 269; of acquired characters, 232, 261–265, 311, 437; of child modified by mother care, 326–329, 524, 526; completed at point of fertilization, 259, 269; conditioning, 268, 304; confusion of, with pre-natally acquired traits, 230; the consanguineal association theory of, 231, 234, 428, 443; control through, 23; of defects, 319, 320; delayed, 270, 333, 343; difficulties, 436–438; of diseases, 16, 231; human, 251; importance of, 3–5, 17; indefiniteness of the concept of, 231; of language ability, 434; of memory, 435; of mental, moral, and social traits, 231, 236, 261; misconceptions regarding nature of, 230–232; mnemic theory of, 262; of musical ability, 432, 433, 437; of special abilities, 430–438; of special abilities by classes or groups, 431; somatic, 257; is always structural, 248, 250, 309 ff., 343, 515; traits, differ from somatic, 263–265; uncritical assumption of, 230–232; by unit characters only, 224, 236, 248, 259, 509.
Inhibition of instinctive responses in man, 289.
Insects, 89, 93, 103, 104, 249, 530.
Instinct, as an abstraction, 139, 164, 175, 227, 509; as activity complex, 155, 259, 262, 266, 297; and adaptation, 82, 83; and consciousness, 74 ff., 81, 82, 452, 453; biological character of, 226 ff., 248–267; biological conception of, 61, 248–267; chaotic condition of the theory of, 188; chemical theory of, 73, 74; central control of, 137, 138, 311, 316–319, 326, 329–339, 344–346, 356, 515, 517, 519, 529; complexity of, 68 ff., 81, 82; confusion of, with habit, 133, 139, 140, 221, 451, 513, 516; criterion of, 6, 59–86, 148–154, 221–229, 231; critical use of term, 81–84, 172, current usage of, 122 ff., 173, 221–247, 513; defined in terms of end, 62, 63, 79, 81, 82, 135; defined in terms of endocrinology, 73, 74; defined in terms of lapsed intelligence, 72, 73; defined in terms of structure, 67; definition of, 5, 60 ff., 122, 124, 139, 164, 226; delayed character of, 71, 81, 249; deterioration of, 85, 86, 249, 326–329, 444, 524, 526; distinguished from habit, 3 ff., 18, 59, 250, 324, 346; distinguished from the reflex, 68 ff.; dominance of, 22, 27, 51, 55, 121, 329, 355, 516; education of, 5, 84, 85; external treatment of, 166; fixity of, 84, 85, 249; importance of, 3–5, 26 ff.; and inheritance, 61, 81, 83, 248–267; in insects, 89, 93, 103, 104, 249, 530; metaphysical doctrine of, 240–243; misconception regarding, 221–248, 416–453; modification of, 78, 103, 136, 372; modification of responses, 78, 136, 372; modifications of stimulus, 78, 136; overlaying of, by habit, 317; and pathology, 82, 83;

perversion of, 526; problem of, approached from wrong end, 533, 534; psychological conception of, 61, 240–243; segmental theory of, 445–449; and society, 83; structure of, 5 ff., 248–267, 324, 343, 376, 387, 515; sublimation of, 526; survival value of, 428; teleological concept of, 445; universal application of term, 175; universality criterion of, 221–229, 231; unmodified central segment theory of, 457, 517, 518; vagueness of term, 122 ff., 172; as a value concept, 139, 155, 164, 166, 401–403, 416, 531; variability of, 5, 62, 63, 78, 84, 85, 136, 303–414, 457.

Instinct, acquisitive, 363; of altruism 359, 260; anger, 381–383; of belief in God, 226; cleanliness, 391, 392, climatic, 397; of construction, 344–352; copulation, 376; courtship, 373–375; of criminality, 305 ff.; of curiosity, 398; defeating antagonists, 384; of disgust, 390; to drink intoxicants, 251; exploration, 398; fighting, 380, 381; of flight, 249; food-getting, 393; of freedom, 362; of gregariousness, 357, 358, 369–372; herd, 369; hunger, 393; manipulation, 398; mastering, 384; maternal, 290, 321–339, 378; monarchical, 223; mother, 378; to murder, 314; parental, 340, 378; paternal, 339–340, 380; play, 342, 343, 349–352, 398; of pugnacity, 342, 344, 352; of religion, 228, 229; of reproduction, 286–289, 373, 377; of revenge, 360; of securing shelter, 396; of self-abasement, 226, 227, 228; of self-assertion, 383; of self-defense, 386; of self-preservation, 360–362; sex behavior, 376; of shrinking from injury, 388; of swallowing food, 394, 395; of submission, 387; for truth telling, 237; walking, 397.

Instinct, criteria of: acts or attitudes necessary to the maintenance of the race, 288; coexistence in parent and child, 230–232; end response, 62, 63, 79, 81, 82, 135, 148, 149, 163, 154, 157, 180, 314, 325, 376, 395, 402, 520; first term situations, 148, 150, 151; function, 148, 149, 154, 157, 180, 314, 520; immutability, 292; inner structure and organization, 5, 60, 67, 122, 124, 139, 152, 153, 155, 164, 226, 250; origin and affinities, 148, 151, 152; pleasurable quality of the activity, 63–65, 521; uniformity of conditions of appearance, 292–295; uniformity of time of appearance, 292–295; universality, 221–229, 231.

Instinct theory, criticisms of, 136, 221–248, 416–453, 521, 534.

Instinctive, attitudes: in maternal complex are diverse, 338, in maternal complex are elementary, 338, in maternal complex are interchangeable, 339; national 224; belief in God, 221, 224, 225–228; belief in immortality, 221, 225, 228; "core", 316, 319, 326, 329–339, 344–346, 356, 517; "man", 240; "tendency", 311, 318, 319, 515–519, 529; tendencies, 159, 219, 220; truth telling, 236 ff.; "urge", 515.

Instinctivists, 31, 54, 290, 296, 297, 343, 416, 418, 436, 445, 449; modify concept of instinct to fit new facts, 449, 450; and panaceas, 140; and unilateral explanations, 140.
Instincts, atomic theory of, 445, 449; balancing of opposite or antagonistic, 297; biological nature of, 60 ff., 188, 226, 248–267; classification of, 135, 140, 142 ff.; conflicting theories of, 418; definiteness of true, 84, 85; diversity of content of, 342 ff., 369–414; false, 321 ff.; fundamental, 139; as habit complexes, 157; indefinite, 126, 218, 219; interchangeability of, 317, 342–364, 378–400, 403–415; absurd multiplication of, 331; mutational, 423–428; narrowed classification of, 140; peculiar, 126, 218, 219; relative; frequency of, 217, 218; specific classes of, 188, 217; statistical improbability of, arising through mutation, 425–427; types of, 32, 122 ff., 142–145, 148–220, 455; utilization of, for control, 23; variety of classes of, 187.
Instincts, classes of: acquired, 128, 133, 134; adaptive, 154, 156; anti-social, 193, 215; æsthetic, 155, 191, 216; aggressive, 158, 168; altruistic, 154, 192; central, 137, 139, 166; Climatic, 203, 216; curiosity, 165; defensive, 158, 168; delayed, 249, 268–304, 333, 450, 525, 526; disgust, 194; disintegrated, 448, 451; fear, 165, 197, 215; food, 167, 198, 215; fundamental, 139; economic, 195, ethical, 195, 215, family, 196; flight, 197; gregarious, 199, 215; group, 156; imitative, 203, 215; impersonal, 154; individualistic, 154, 156; intellectual, 200, 214, 216; migratory, 203, 216; miscellaneous, 191–207, 209–214; national, 223; negative, 165; nutritive, 158; organic, 159; parental, 155, 156; personal, 154, 161; play, 161, 165, 168, 204, 216; positive, 165; pugnacity, 165, 285; recessive, 204, 215, 218; regulative, 156; religious, 155, 205; repose, 204; reproductive, 158, 286–288; repulsion, 194; rest, 168; retaliative, 206, 216; self-abasement, 207, 215, 216; self-assertive, 208, 214, 215, 216; self-display, 209, 216; self-preservation, 156; sex, 155, 168, 210, 215, 216, 292–295; shelter, 167; sleep, 168; social, 155, 156, 159, 199; specific, 188, 217, 218; vestigial, 249, 448, 525; visceral, 447; vocalization, 169; workmanship, 211, 216.
Instincts, classifications of: comparison of, 218, 220; composite nature of, 190, 369–414; condensing, 176 ff., 214; confusion of 155, 157, 158, 163, 166, 181, 378; criterion of, 170; difficulties of, 148–153, 166, 176, 215; divisions of, adopted in this study, 179; dominant types of, 188; by end term responses, 148–149, 163; by first term situations, 148, 150, 151; by functions, 148, 149, 154, 157, 180; groups of, 180, 182 ff., 188; by inner structure and organization, 152, 153, 155, importance of this method, 153; key terms of, 179 ff.; major, 190 ff., 220; miscellaneous, 186; mixed, 163, 166; number found, 187; ob-

jective basis of, 178; overcondensation of, 178; by origins and affinities, 148, 151, 152; overlapping of, 155, 157, 166, 175, 176, 188, 190, 215, 385, 387, 388, 391–393, 397, 398, 403–415; necessary procedure in, 152; in qualitative terms, 151; in quantitive terms, 151; scientific, 170, 171; vagueness of, 172; values of, 151, 170.
Institutions, 34, 92, 118, 120, 234, 454, 523, 533; shape moral and social traits, 234.
Intellectualistic bias, 62.
Intelligence, function of, 56, 290.
Interdependence of modern life, 439.
Internal habit, 98 ff.
Invention, a time saver, 105.
Irritability of protoplasm, 38, 39.

James, W., 65, 143, 144, 368.
James-Lange theory of emotion, 519.
Jelliffe, S. E., 141.
Jennings, H. S., 38, 85, 98.
Jesus, 504.
Jordan, D. S., 150, 216, 377, 386, 394, 397, 398.
Judd, C. H., 68.
Jung, C. G., 141.

Keller, A. G., 129.
Kellogg, Vernon, 150, 216, 377, 386, 394, 397, 398.
Kempf, E. J., 43, 46, 47.
Kidd, B., 123, 127.
King, I., 75, 225, 228.
Kirkpatrick, E. A., 155–157.
Ladd, G. T., 70, 75.
Lamarck, J. B., 311, 418, 522.
Language, 101, 107, 300, 301, 438, 512; acquired, 109; advantages of oral, 110 ff.; advantages of written, 112 ff.; conversational element in, 107, 108; and habit, 108; instinctive element in, 108; spoken or oral, 101, 109, 112; as a storage mechanism, 116; and thought, 110; written, 101, 109, 112.
Lapsed intelligence theory of instinct, 72, 73.
Learned adjustments, 287, 350 ff.
Learned elements in child caring complex, 322 ff., 331.
Learning, 350–352; and prolongation of infancy, 326, 444, 519.
Leuba, J. H., 226, 228.
Libraries, 116.
Lillie, R. S., 255.
Localization, 348, 350, 352, 362, 363; sensori-motor, 271, 345.
Localization-adjustment process, 345.
Loeb, J., 64, 69.
Logical method, 500, 501.
Lombroso, C., 313, 418, 419.

McBride, E. W., 256.
McDougall, W., 19, 37, 54, 76–80, 122, 136, 137, 140–142, 222, 246, 287, 334, 336, 357, 368, 369, 416, 455–457, 471, 472, 482, 483, 486–491, 493–496, 500, 505, 515–519, 522, 529, 532.
Magical interpretation, 244, 318.
Mangold, G. B., 130.
Maternal care substituted for instinctive guidance of child, 326–329, 524, 526.
Maternal complex, 290, 292, 322–339; inherited elements in, 326.
Maternal responses to child, 339; affective element in, 334–337.

Mechanism of transmission of social traits not well understood, 232, 234, 235.
Mendelian ratio, 421, 423.
Mendelian theory, 15, 224, 230, 232, 245, 248, 249, 254, 258, 265, 269, 270, 324, 325, 418, 419, 421, 423, 438, 511, 515, 521, 522.
Mental attitudes, complex, are abstractions, 302, 305.
Mental technique, 441, 442.
Mental traits are acquired, 295 ff.
Meredith, George, 124.
Metabolism, 39, 42, 300, 301, 347, 348.
Metchnikoff, E., 282, 284.
Metaphysical doctrine of instinct, 240–243; of natural law, 239–241.
Metaphysical interpretation, 119, 239–243, 366; of history, 221.
Metaphysical essences, 240, 241; viewpoint, 501.
Meyer, M. F., 60, 72, 145–147, 455, 461.
Mind of child flexible, 351.
Minot, C. S., 282, 284.
Misconceptions regarding instinct, 221–248, 416–453, 521, 534; that all automatisms are inherited, 442–444; that complex instincts arise by mutation, 423–427; that the end is implicit in the instinct mechanism, 445, 451, 452; that the environment is relatively simple and rigid, 439, 440; that environments of the same time and place are identical, 440–442; that instinctive action is always pleasurable, 521; that instincts are atomic units in an activity complex, 445–449; that instincts are generalized activity tendencies involving the whole organism, 450; that major harmful traits survive, 416–423; that the number of instincts increases with the complexity of the type, 428–430; that special abilities are inherited as such, 430–438.
Misconceptions regarding instinct, origins of, 221–247.
Mnemic theory of inheritance, 262.
Modification of instinctive responses in maternal complex, 331.
Modification of responses, 78, 176, 372; of stimuli, 78.
Moral attitudes, complex, are abstractions, 302, 305.
Moral traits, 232, 234, 235; are acquired, 260, 295 ff.; relative to environment, 238.
Morgan, T. H., 254.
Morris, Williams, 241.
Moton, R. R., 294.
Movement, 38 ff.; random, 38, 108, 346, 347.
Münsterberg, Hugo, 128, 134.
Mutation, social, 422, 528.
Mutations, 423, 424, 426, 427, 428, 527, 528; complex, unlikely, 426, 432, 527, 528; environmental cause of, 427; in moral and social traits assumed, 232.
Multiple excitation, 78; response, 78, 176, 372.
Mysticism, 244, 318.

National drinking habits, 223; eating customs, 223; instinctive attitudes, 223, 224.
Natural law, doctrine of, 239–241, 366.
Natural rights, doctrine of, 239–243.

Natural selection, 417, 420, 421.
Nervous system, 41, 43 ff.; autonomic, 44–47, 446; origin and development of, 47; sacral, 44; sympathetic, 44; vagus, 44.
Neural controls, acquired, 378, 446–449.
Neural correlate, 227, 236, 319, 350 ff.
Neural dispositions organized into complex habits, 426, 446–449.
Neural organizations, acquired, 301–304; subconscious, 427.
Neural set, 227, 351.
Neural structures, 11, 13, 310; growth of, 281, 301, 426, 435, 448.
Neurons, extension of, 435.
Neuro-psychic complex, 448; development, 92; mechanism, 87 ff., 350.
Neuro-psychic technique, 87 ff., 99 ff., 441; acquired, 91 ff., 301, 435; conscious, 99 ff., 301; internal, 99 ff.; mixed, 99 ff.; overt, 99 ff.
Nicholls, Sir George, 130.
Nietzsche, F., 32, 127, 243.
Novel, 115.

Ogden, R. M., 70.
Organism acts as a unit, 445–450.
Organism, segmental theory of, 446–449.
Original annoyers, 399; satisfiers, 400; nature, 32.
Outline of subject, 18, 20.
Overt habit, 98, 118.

Panaceas, and instinctive solutions 140; and instinctivists, 140.
Pangenesis, theory of, 269.
Parasitism, social, 417.
Paternal complex, social causes of, 339.
Paternalistic society, 423.
Paton, S., 42, 44, 46, 48, 54–56, 281, 434, 435.
Pearson, Karl, 231.
Perception, 456–461.
Perla, Leo, 455.
Petrarch, 485.
Philanthropy, mistaken, 417.
Philosophic viewpoint, 229.
Pillsbury, W. B., 62–65, 75, 451, 521.
Plato, 366.
Play, and childhood, 350; relation of, to construction and fighting, 352–357; and creation, 354; distinguished from fighting, 352, 353; function of, 349, 351; no general all-inclusive act called, 342; and learning, 350; and older people, 351; a synthetic concept, 343.
Plays, 115.
Pleasantness, 460–462, 467.
Poetry, 115, 352.
Post, Louis F., 439.
Prayer, as a form of conversational thinking, 108.
Predispositions, general 456, 483.
Preyer, W., 143, 367.
Progress, through adjustment, 88 ff.; through conscious control, 49–58; through evolution of neuro-psychic technique, 101 ff.; inevitability theory of, 451; through language, 101, 107 ff.; limitations to, 35, 36; and symbolization, 93, 103 ff.
Prolongation of infancy, 326, 444, 519, 524.
Protoplasm, function of, 38; irritability of, 38, 39.
Prophets, Hebrew, 504.

Psychoanalysts, 141, 246.
Psychologists, 13, 68, 532, 533.
Psychology, behavioristic, 501, 502; British, 62; comparative, 245; educational, 532, 533; experimental method in, 245, 367, 501; metaphysical, 241, 501; social, 454, 532, 533.
Psycho-social environment, 11, 13, 21, 42, 54, 58, 121, 229, 246, 328, 342–344, 347–364, 439, 444, 447–449, 462, 511–513, 523, 524, 533.
"Psychosis, none without neurosis," 236.
Public opinion, 512, 523.

Random movements, 38, 108, 346 ff., 447, 448, 531; vocalizations, 108, 300.
Reductio ad absurdum, 305–320, 418, 429, 515, 528.
Reflexes, 68, 346, 347, 372–375, 403–414; distinguished from instincts, 68 ff.; feeding, 394.
Reid, Thomas, 366.
Reinsch, P. S., 130.
Religion, early, 225; and instinct, 225; instinct of, 228, 229; preanimistic, 225; varies by classes, 228;
Religious beliefs, rapid change of, 226.
Religious personalities, human creation of, 225.
Responses, acquisitive, 396; substitute, 78, 136, 372.
Revelation, 108.
Ross, E. A., 9, 358.
Ruling classes, 431.
Russell, Bertrand, 33.

Satisfiers, original, 40.
Schneider, G. H., 143, 368.
Scholastic attitude, 501.
Science of environment, 232–235; recent, 232–235, 439; slow development of, 233.
Science and instinct, 367.
Sciences, general, 117; special, 117.
Scientific method, 463, 501; terminology, 225, 226.
Scientific viewpoint, 221, 229, 243, 247; dominance of, 244.
Scotch metaphysicians, 241, 366, 369; psychologists, 61, 241.
Seeger, Alan, 352.
Segmental functioning, 445.
Segmental theory, of action, 445–449; of instincts, 445–449.
Selection, by blind survival, 421, 452; natural, 417, 420, 421, 430; social, 295, 417.
Selective survival, 423.
Semon, Richard, 262.
Sensation, 459–461, 467.
Senses, 460.
Sensitivity of protoplasm, 39, 41; to stimuli, 41.
Sensory basis of intellectual life, 460, 461.
Sensory perception compared with feeling as guide to adjustments, 459.
Sentiment, of admiration, 489; definition of, 483, 495, 500, 501; environmental control of, 488; and feeling, 488; a form of emotion, 483; intellectualization of, 487; of parental love, 495; recognitive element in, 484, 488, 506; self-regarding, 485, 486, 495; socialization of, 487; sublimation of, 487, 504; of tenderness, 488; values of, 485, 504.
Sentimentality, 504.

Sentiments, 454, 483–496, 506; atomic theory of, 489, 496; classification of, 491–496; types of, 487, 490–492; variability of, 489, 490.
Shakespeare, William, 366, 488.
Shand, A., 141, 170, 369, 381, 389, 454.
Skills, acquired, 438, 510, 511.
Slaughter versus breeding in social control, 223.
Small, A. W., 129.
Smith, S., 369, 376–378, 384, 391, 394, 396.
Social analysis, 243, 297.
Social attitudes, complex, are abstractions, 302, 305, 342.
Social control, 23, 24; through environment, 232–235; based on science, 422.
Social evolution, 298; "heredity", 321; improvement, 24; mutation, 422, 528; parasitism, 417; psychology, 454, 532, 533; selection, 295, 417; variation, 29.
Social progress, 298; limitations to, 35, 36.
Social traits, 88 ff., 232–235; acquired, 260, 295 ff.
Social transmission, is lateral as well as longitudinal, 233, 234, 419–422; similarity of, to biological transmission, 233–235, 419–422.
Social values relative to environment, 238.
Sociological views, derivative character of, 230.
Sociology, 501, 502, 533, 534.
Somatic inheritance, 257, 263–265.
Somatic and inheritance traits differ, 263–265.
Sources of material of this study, 174 ff.
Special abilities, acquisition of, 435; complexity of, 436–438; conditional acquirement of, 436; difficulties of inheritance theory of, 436–438; and environment, 437; inheritance of, 430–438, 528; localization of, 434, 435; modern character of, 437; sudden appearance of, 437.
Speech, 107 ff.
Spencer, Herbert, 244.
Starch, D., 532.
Statistical improbability of instincts arising through mutation, 425–427.
Statistical method of studying heredity, 231, 232.
Stewart, Dugald, 366.
Stimuli, 41.
Stimulus-response activities, 188; process, 248.
Stout, G. F., 61, 64, 75.
Structural similarity of instinct and habit, 451.
Structural similarities in opposed value complexes, 297.
Suggestion, 234.
Supernatural, belief in, 226.
Super-man, 32.
Survival value of traits, 289.
Symbolic adjustment, 103 ff.; content of language, 109; thinking, 103, 110.
Symbolism, oral, 108; written, 109.
Symbolization, 92, 105, 106, 344; of abstract ideas, 92; of environmental relationships, 105, 337; a human trait exclusively, 92; language, 110.
Symbolizing mechanism, 107.
Symbols, 11; oral language, 107; written language, 107 ff.

Synapses, completion of, 435; flexible, 11; uncompleted, 351, 352.
Synthetic abstract terms, 386.

Tansley, A. G., 142.
Taussig, F. W., 141.
Technique, acquired by man, 91 ff.; complex moral and social, 232.
Teleological viewpoint among instinctivists, 445, 452, 453.
"Tendency" as basis of instinct, 311, 318, 319, 515–519, 529.
Tender emotion, 334–338.
Theological doctrine of classes, 239; interpretation of history, 221; terminology, 225, 226; viewpoint, 366.
Thinking, 110, 455, 458, 463; conversational, 107, 108; habits of, 127, 351; and language, 110; mixed with emotion, 463–465; a substitute for overt action, 110, 111; symbolic, 103, 108, 110.
Thomson, J. A., 417.
Thought, distinguished from emotion, 465, 467; potential, 120; symbolic, 107, 110.
Thoreau, 110.
Thorndike, E. L., 37, 65, 72, 85, 140, 144, 146, 147–152, 154, 155, 163, 170, 369–372, 376–378, 380–384, 387–390, 392, 393, 396, 399–401, 522.
Titchener, E. B., 60, 69, 73, 75.
Tower, W. L. 255.
Tradition, 226, 240, 427, 482, 512, 523.
Training, 372; theory of, 369.
Transmission, lateral, of environmental traits, 24, 233, 234, 315, 419, 528; social and hereditary, confused, 231–235, 315.
Treatment of the subject, plan of, 20 ff.
Tropic responses, 357.
Tropisms, 64, 79, 287, 291, 358, 443.
Trotter, W., 81.
Twain, Mark, 128.

Unilateral explanations and instinctivists, 140.
Unit characters, 232, 248, 297, 311 ff., 324, 343.
Universality argument for instinct, 221–229.
Universality due to environmental pressures, 229.
Unpleasantness, 460–462, 467.
Usage of instinct, 122 ff., 173, 221–247, 513; analysis of, 173 ff.: results of, 174 ff., sources of, 174 ff., sources of materials for, 174; chaotic, 128, 172, 402; classes of, 122 ff.; conflicting, 402; confusion of, 175, 402; correlation of, 179; current, 179; by the dramatists, 124; early, general, 365; erroneous, 221–247; indefinite, 124–175; literary, 123, 124; modern, concrete, 366; by the novelists, 124; origins of, 365; by the poets, 123; random, 178; redundancies in, 125; unbalanced, 178; unscientific, 123, 128, 172, 221–248; vague, 132, 172, 175.

Valuation of adjustment, by emotion, 463; by feeling, 359; by sensory elements, 459–461; by sentiment, 485.
Valuations, moral, 308, 513; social, 308 ff., 360, 482, 513, 531.
Value complexes, 236, 305, 324, 513; conceptual rather than

structural, 305–320, 385, 386; not fixed neural mechanisms, 236 ff., 320, 354–362, 386; structural elements in, may be same in opposite values, 297; vary according to circumstances, 237–239, 359.
Value concepts, 320, 358–362; mistaken for instincts, 401–403, 416, 531; synthetic, 386, 531.
Veblen, T. B., 79, 80, 131, 132, 325, 354, 416, 451.
Vitalism, 451, 522.
Vocal language, 107 ff.
Vocalization, random, 108, 300.

Wallis, Louis, 239.
Ward, James, 60.
Ward, Lester, F., 298.
Warner, A. C., 133.
Warner, C. D., 128.
Warren, Howard, 68, 69, 75, 158, 372–375, 473, 491, 492, 495–500.
Washington, B. T., 294.
Watson, J. B., 66, 67, 69, 76, 142, 166–170.
Weismann, August, 16, 224, 230, 245, 269, 418, 521, 522.
Whetham, C. D., 430, 431, 432.
Whetham, W. C. D., 430, 431, 432.
Woodworth, R. S., 44, 55, 67, 70–72, 75, 159–164, 170, 222, 369, 373, 376–380, 383, 387, 388, 392, 393, 397, 398, 433, 434, 438, 522.
Working classes by heredity, 431.
Wundt, W., 72, 73.

Yerkes, R. M., 60, 74.